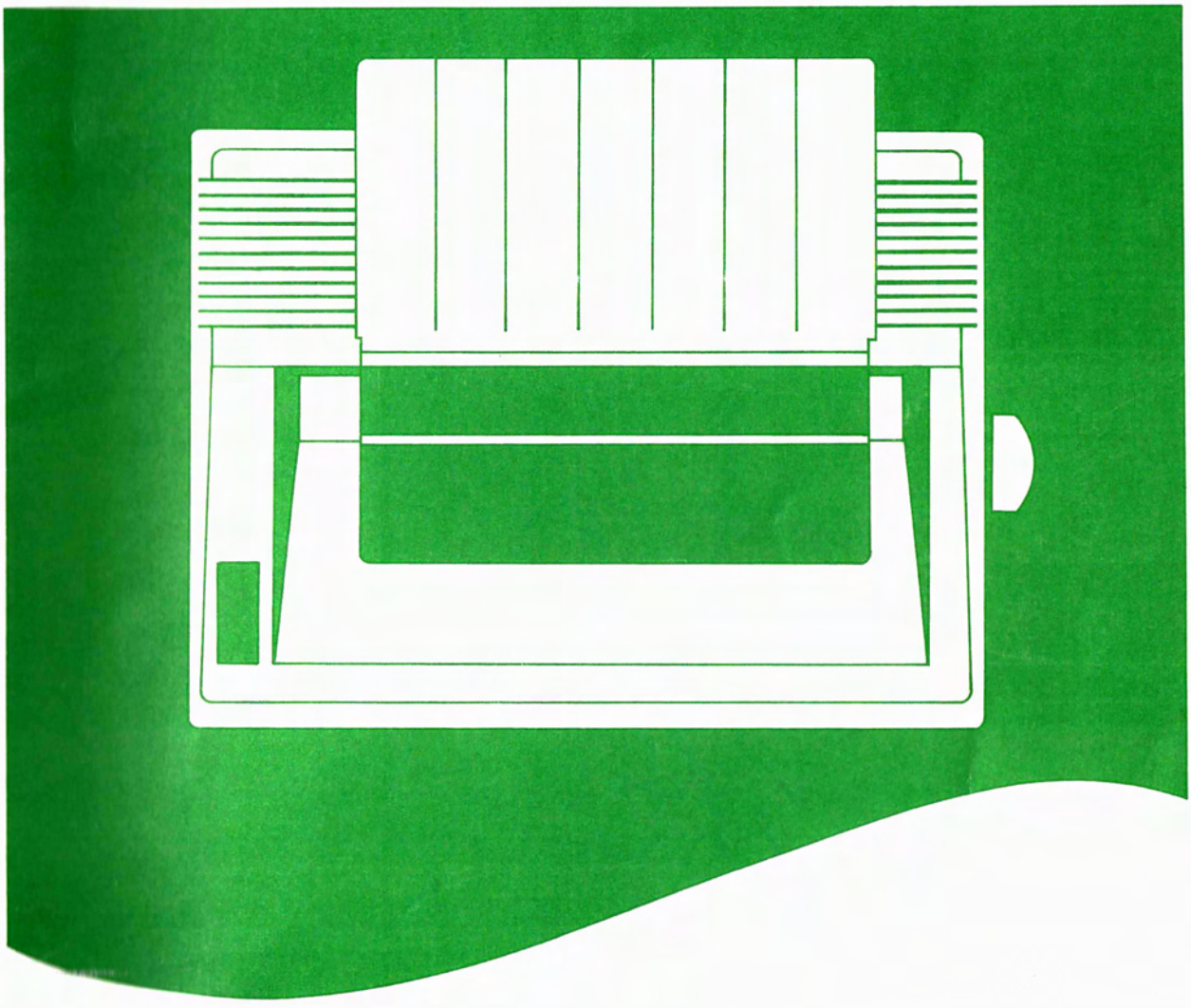
# SP-180VC
# MATRIX PRINTER

# OWNER'S MANUAL



SEIKOSHA

**WARNING:**
"This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only computers certified to comply with the Class B limits may be attached to this printer. Operation with noncertified computers is likely to result in interference to radio and TV reception."

"This equipment generates and uses radio frequency and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems",

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

"It is necessary to use shielded interconnect cables to insure compliance with FCC Class B limits for radio frequency emissions".

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# INTRODUCTION

Congratulations for selecting this dot-matrix printer!
The printer can be connected to your Commodore Computer, such as Commodore 64, with the following features provided:

1. A variety of character fonts are possible including Near Letter Quality (N.L.Q.) and Graphic printing.
2. Self Test printing
3. Automatic printing
4. Double-Width character mode
5. Double-Strike character mode
6. Reverse printing
7. Italic Cursive character mode
8. Internal RAM error detection
9. Left and right margin settings
10. Emphasized character mode

# CAUTIONS FOR USE

- Do not use a power supply voltage that is other than the specified one.
- Wait at least two seconds after turning power off before turning it back on again. The initialization process may not be performed correctly if this is not done.
- The printer should be used when the humidity is low, when there is little dust, and where the printer is not in direct sunlight.
- Do not perform printing without the ribbon cassette and paper properly installed.
- Never install the tractor unit when using friction feed for cut sheet paper.
- Do not touch the print head immediately after printing because it is hot.
- When using continuous forms, refrain from turning the paper feed knob counter-clockwise to feed paper backwards because a paper jam may occur.

# SETTING UP THE PRINTER

## Unpacking the Printer

Be sure to locate the following components that come with the printer in the box.

1. Printer
2. Ribbon Cassette
3. Tractor Unit (installed on printer)
4. Paper Separator
5. Serial Cable
6. Owner's Manual

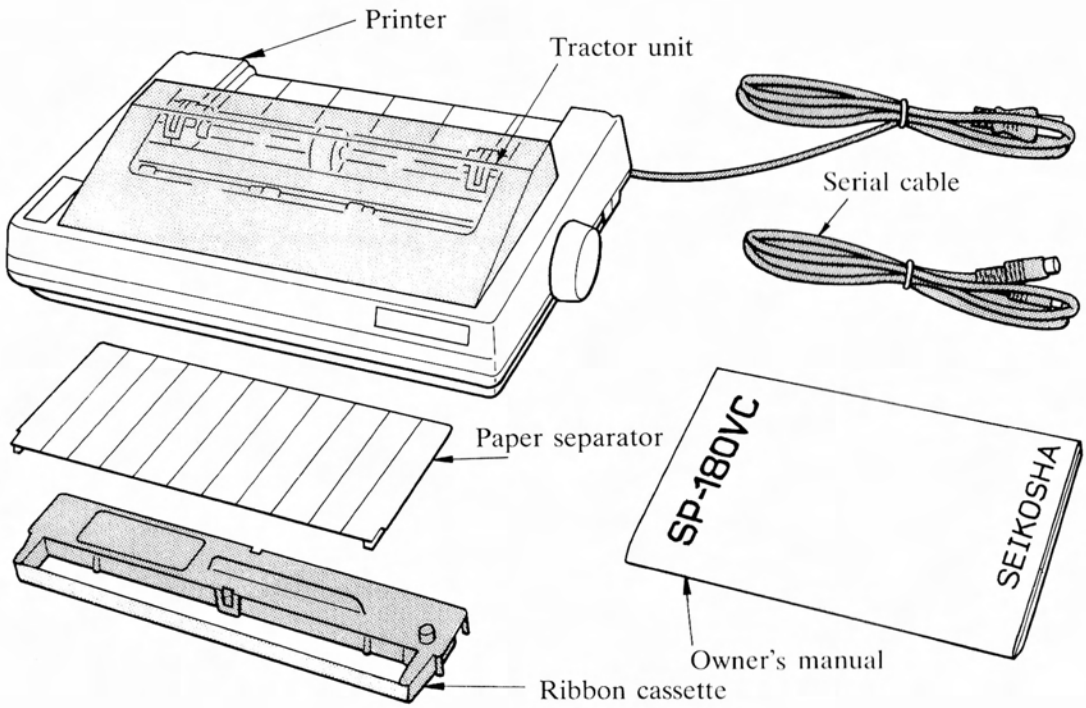



**Fig. 1**

## Operator Controls

It is important to become familiar with the printer before setting it up and using it.

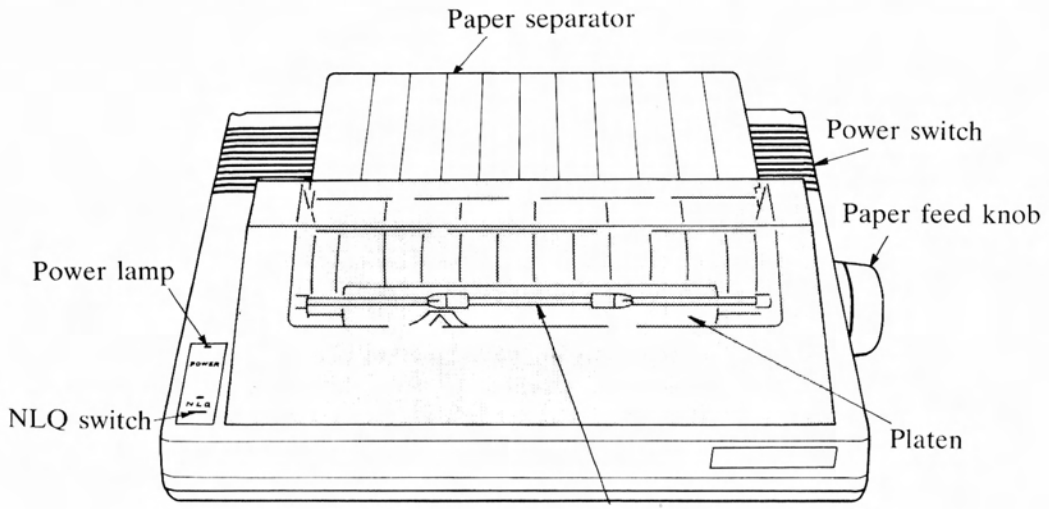



**Fig. 2**

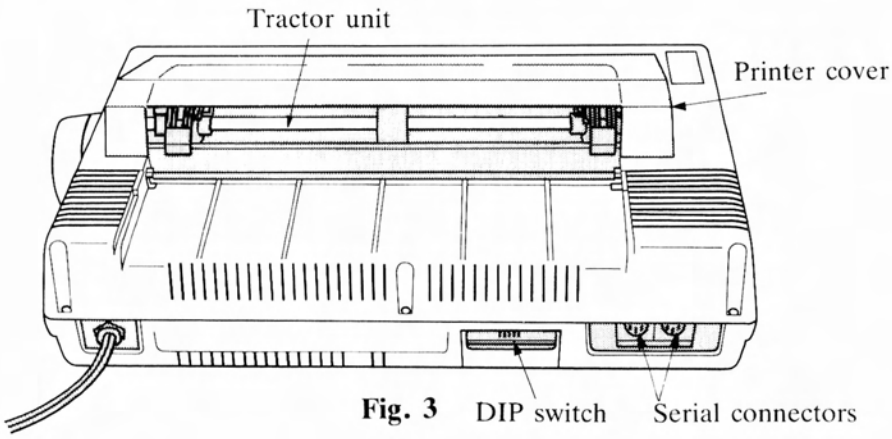



**Fig. 3**

1. Power switch
   This switch turns the printer on and off.

2. Power lamp (green)
   Remains on while the power is on.

3. NLQ switch (Near Letter Quality)
   This switch selects the NLQ or Draft mode.
   If the NLQ mode is selected, the lamp is on.
   If the Draft mode is selected, the lamp is off.

4. NLQ lamp (green)
   The lmap is on in the NLQ mode and is off in the Draft mode.
   While in the error state, the lamp blinks.

## Installing the Ribbon Cassette

1. Unpack the ribbon cassette and turn the ribbon feed knob in the direction of the arrow to remove the slack in the ribbon.

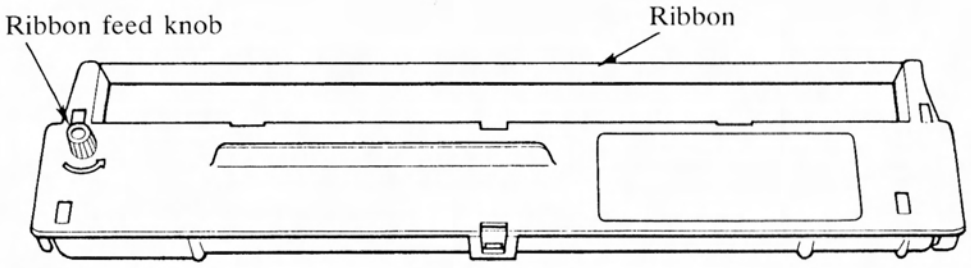



**Fig. 4**

2. Be sure the power is switched off, and manually move the print head to the extreme left.

**Note:** It is easier to insert the ribbon when the print head is at the home position (extreme left).

3. Insert the ribbon between the ribbon mask and the print head, and position the cassette so that the ribbon feed shaft in the printer is inserted into the hole under the ribbon feed knob.

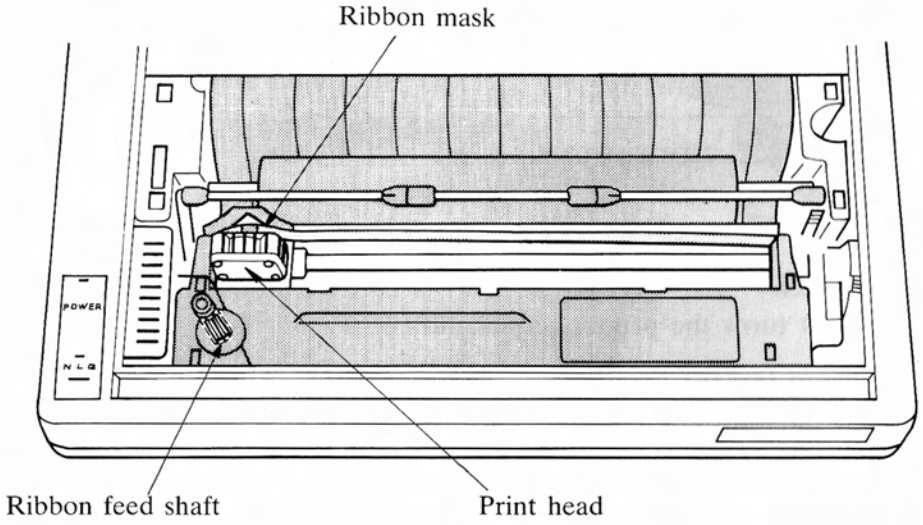
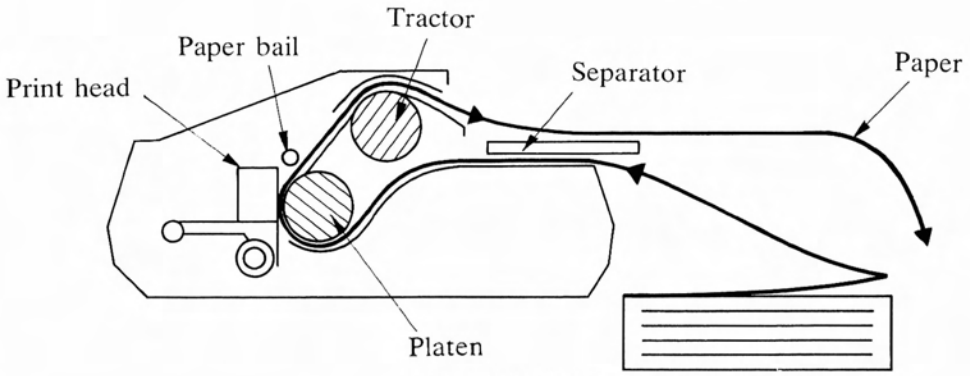



**Fig. 5**

4. Press gently on the cassette until it snaps into place. Twist the ribbon feed knob to tighten the ribbon.

## Using Continuous Forms




**Paper feed path**
**Fig. 6**

1. Remove the printer cover and the paper separator. Pull the paper bail toward the front.
2. Manually feed the paper into the printer from the back until the paper appears between the platen and the print head.

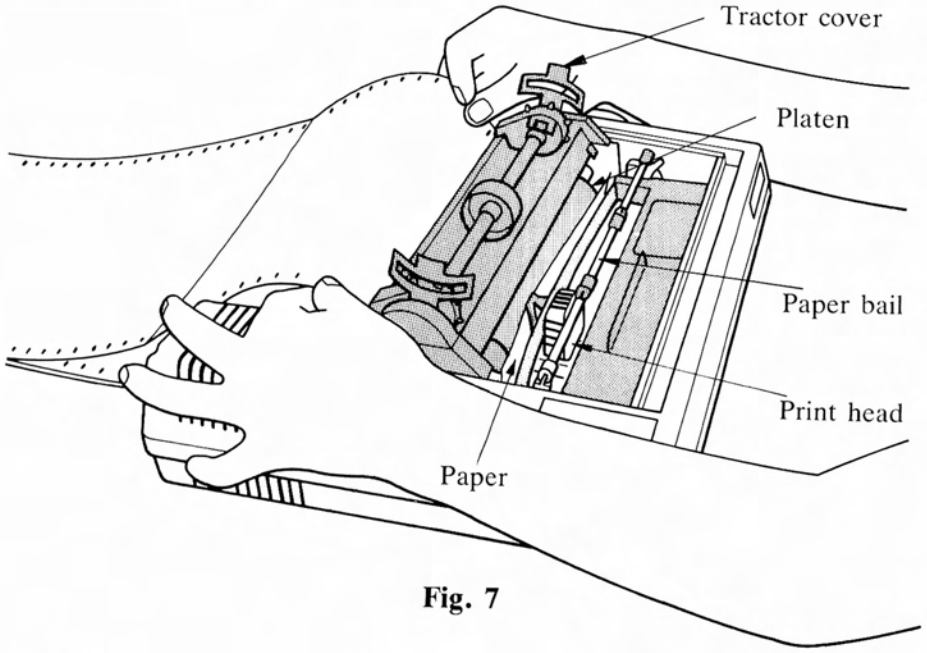



**Fig. 7**

3. Open the tractor covers on the left and right.
   Adjust the tractors so that the distance between them matches the holes in the paper.
4. When the holes along both sides of the paper are aligned with the tractor paper feed pins, close the tractor covers.

5. Push the paper bail toward the platen.
6. Hold the paper separator upright and place it on the two supports located behind the tractor.

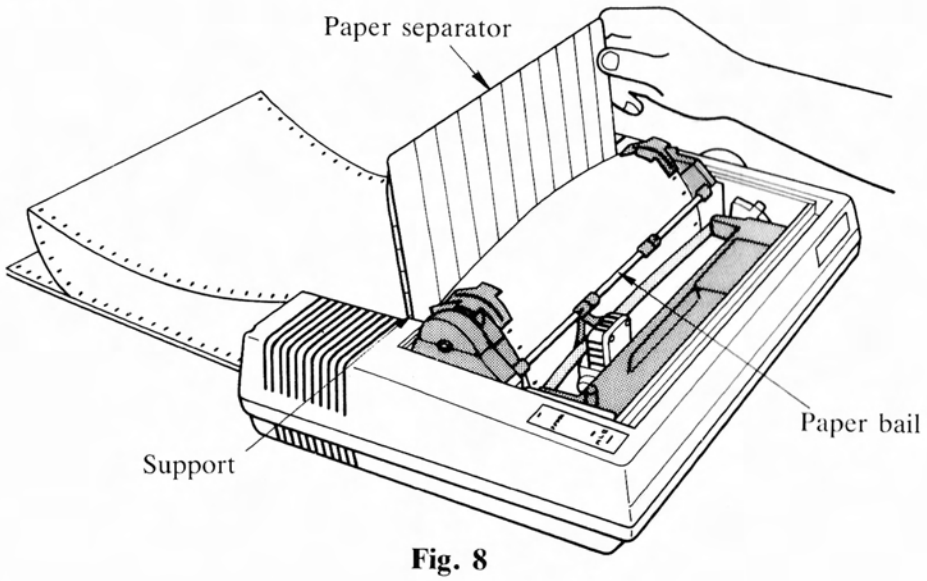



**Fig. 8**

7. Lay the paper separator down flat.
8. Replace the printer cover.

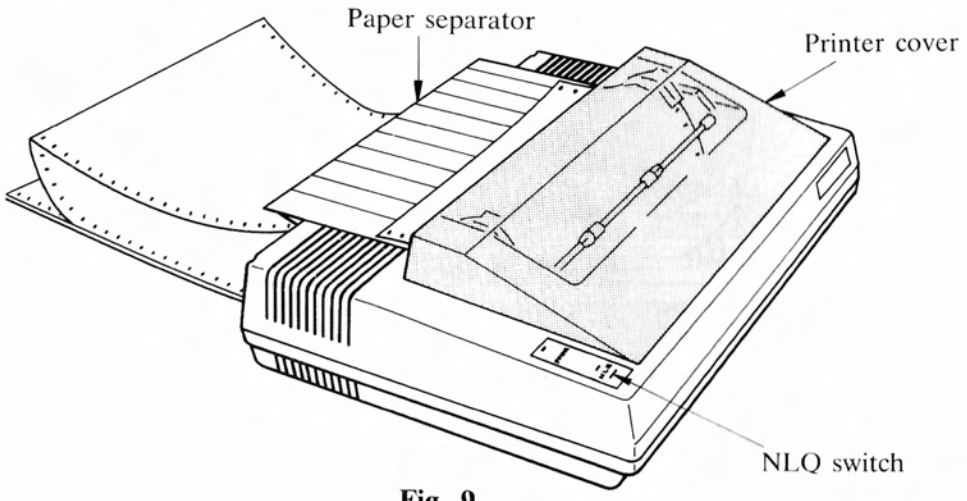



**Fig. 9**

9. Perform self test printing to make sure the printer is working properly.
   To initiate self test printing, hold down the NLQ switch while turning the power switch on. The NLQ switch can be released after self test printing starts.

The printer can now be connected to the computer.

## Connecting the Printer to the Computer

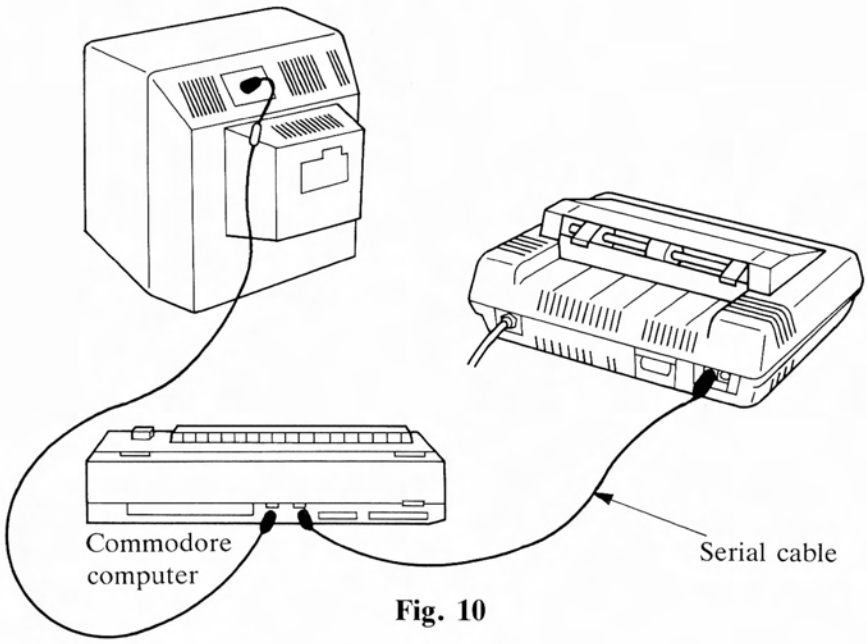



**Fig. 10**

1. Make sure that both the computer and printer are turned off.
2. Connect one end of the 6-pin DIN cable to the connector holes located in the back of the printer at the lower right.
3. Connect the other end of the cable to the computer in the Serial Port Connector located in the back of the computer.
4. Turn on the power to the computer and then to the printer.
5. Type the program below and run it to output data to the printer.

```
10 OPEN1,4
20 PRINT#1,"I BOUGHT A GOOD PRINTER."
30 CLOSE1
```

RUN RETURN

6. The printout should look like this:

```
I BOUGHT A GOOD PRINTER.
```

This printout shows that the hookup you have performed is correct.

## Loading Single Sheet Paper

Remove the tractor unit when using friction feed for the single sheet paper.

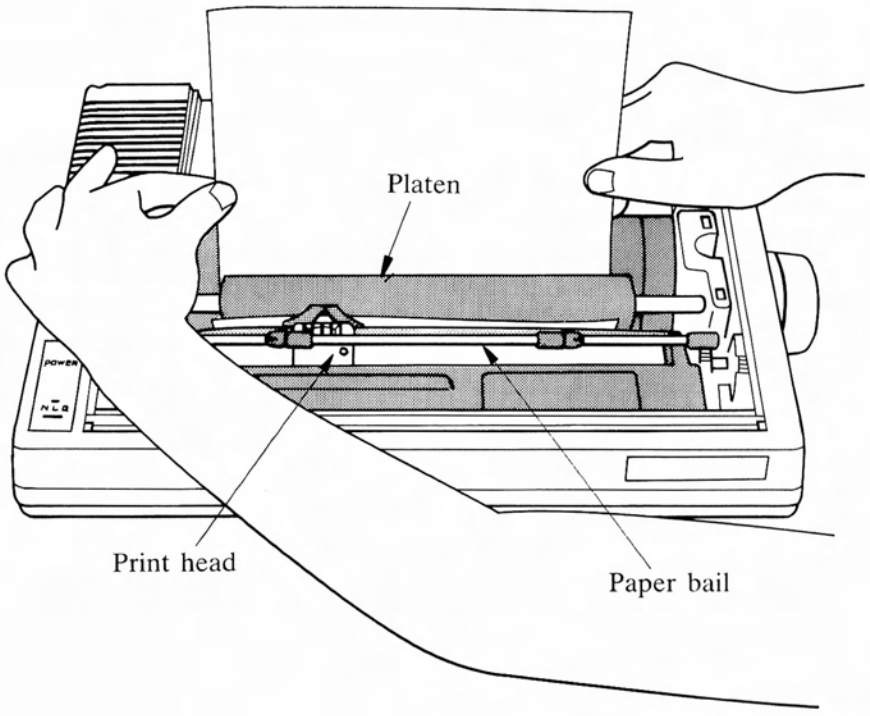



**Fig. 11**

1. Move the paper bail toward the front.
2. Insert the single sheet into the printer from the back by hand until it appears between the print head and the platen.
3. Turn the paper feed knob to feed the single sheet so that both paper ends of the single sheet are aligned.

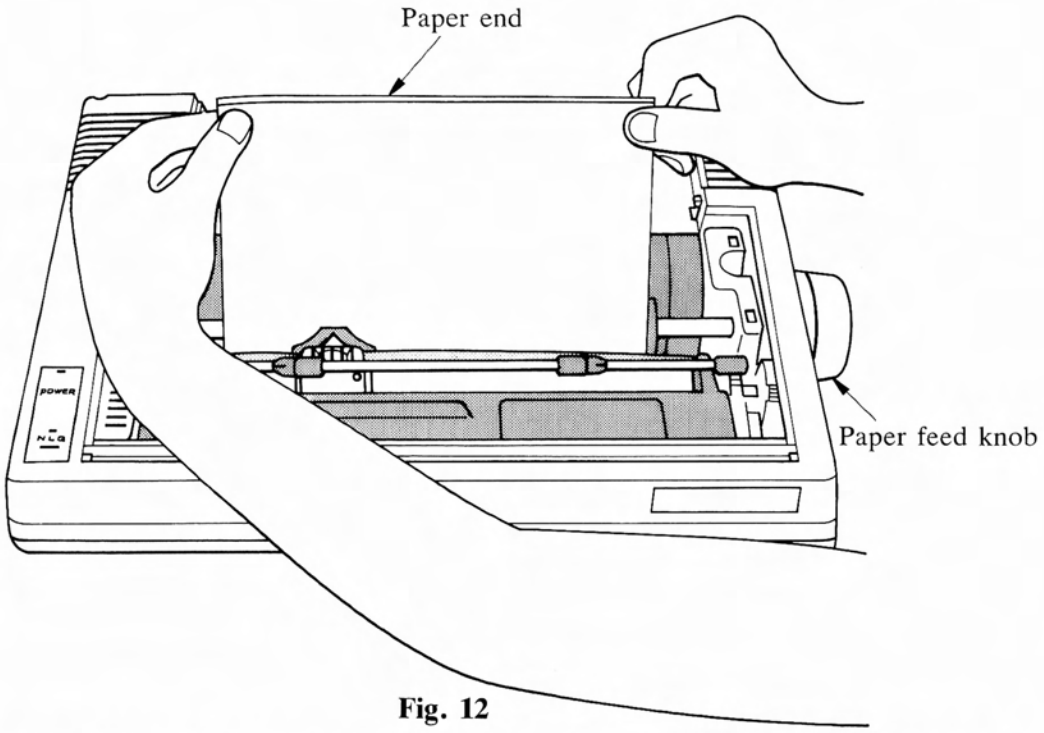



**Fig. 12**

4. Rectify the single sheet so that the upper and lower ends would meet exactly if placed together.
5. Move the paper bail toward the platen to press against the single sheet.
6. Turn the paper feed knob counterclockwise to set the single sheet to the TOF (top of form) position.

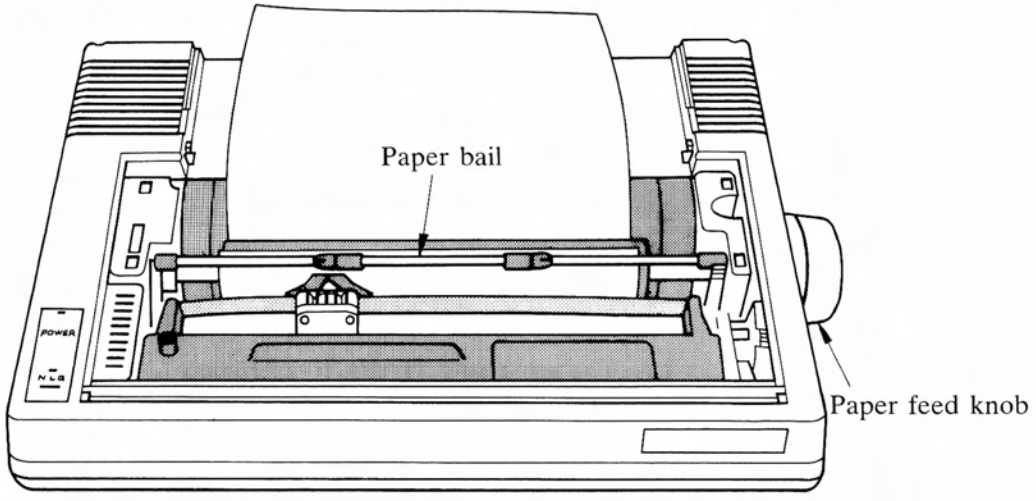



**Fig. 13**

7. Replace the printer cover.

**Note:** The paper bail rollers must press against the single sheet to feed accurately. Printing starts at a position about 4mm away from the left edge of the platen.

## Installing the Tractor Unit

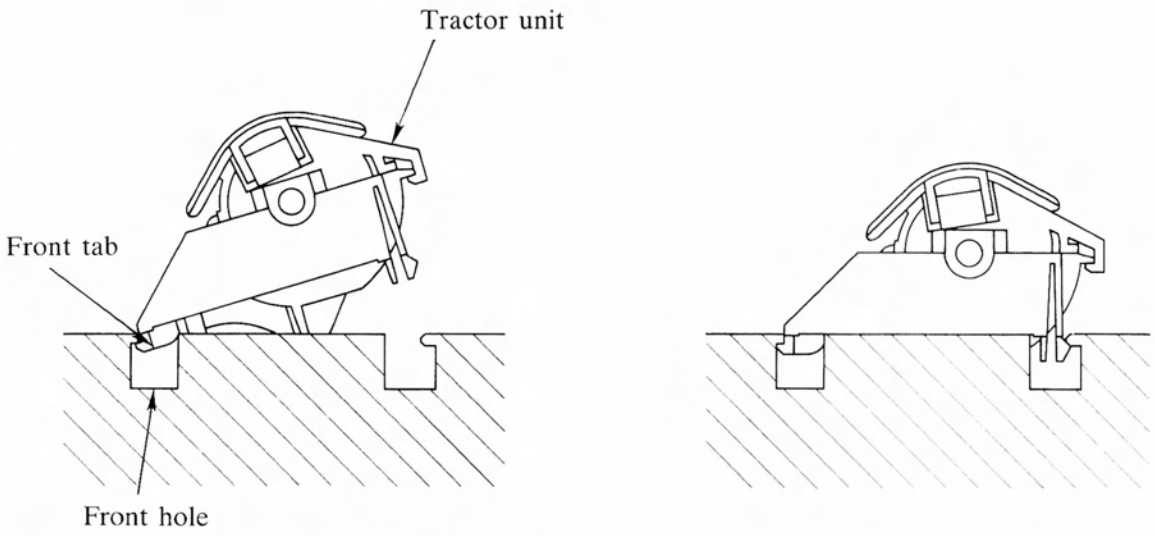



**Fig. 14**

1. Move the paper bail toward the front.
2. Insert the front tabs of the tractor into the holes on both sides of the platen.
3. Push down on both ends at the rear of the tractor until it is firmly secured.

## ADJUSTING THE HEAD ADJUSTMENT LEVER

The blue head adjustment lever on the right side of the print head lets you adjust the gap between the paper and the print head.

The printer is shipped with this lever set to the third position, which is suitable for standard one-part paper.

To print on multi-part paper, pull this lever away from the platen to increase the gap between them.

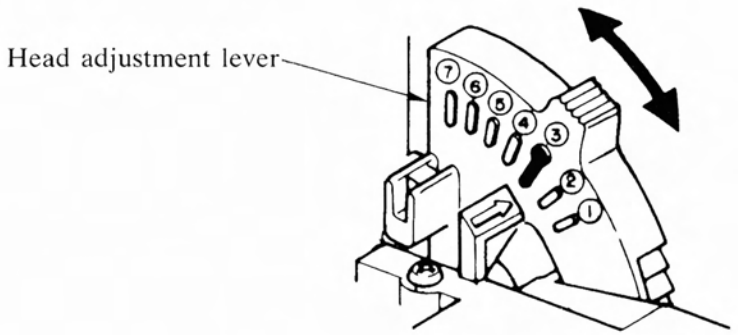



**Fig. 15 Head adjustment lever**

## RUNNING THE SELF TEST

The self test is a built-in program that prints all of the characters alternately in Draft character mode for five lines and NLQ mode for five lines in a continuous pattern.

To start the self test, press and hold down the NLQ switch while turning the power on.

By changing DIP switch 3, two different character fonts are selected as listed below:

| DIP Switch 3 | Character Font Selected |
|---|---|
| ON | ASCII |
| OFF | CBM |

# DIP SWITCHES

The DIP switches are located at the back of the printer. They are covered by a small plastic insert. For most uses, these switches can be left as they were set at the factory. Each switch has two positions: when the switch is moved down, it is OFF; when it is moved up, it is ON. After changing switch settings, turn the power off and back on again to reinitialize the new switch settings.

| DIP switch | Function | | ON | OFF | Factory Setting |
|---|---|---|---|---|---|
| 1 | Device Number | | 5 | 4 | OFF |
| 2 | CBM mode | Page Length | 12 inches | 11 inches | OFF |
| | ASCII mode | CR Code Selection | CR only | CR + LF | |
| 3 | Mode Selection | | ASCII mode | CBM mode | OFF |
| 4 | Print Character Mode | | Pica | Condensed | ON |

In ASCII mode, the page length automatically set at power-on is 11 inches.

# INTERFACE

**1. Connector**

| Pin No. | Signal |
|---|---|
| 1 | SERIAL SRQ |
| 2 | GND |
| 3 | SERIAL ATN |
| 4 | SERIAL CLK |
| 5 | SERIAL DATA |
| 6 | $\overline{\text{RES}}$ |

**2. Interface**

The device number (4 or 5) can be selected by DIP switch 1 located at the back of the printer. When shipped from the factory, the device number is 4.

# ERROR WARNINGS

If the printer stops printing and the NLQ lamp blinks, it indicates that the printer has detected an error condition.
In this case, turn the printer off and back on again. If the NLQ lamp blinks again and still won't print, take it to the store where you made the purchase for repair.

## PRINT MODE PRIORITY AND COMBINATIONS

- In the NLQ, Superscirpt or Subscript mode, the Double-Strike command is not valid when it is received by the printer. It will become valid when the other modes like Draft Pica, Draft Elite, etc. are entered.
- In the Condensed, Superscript or Subscript mode, pressing the NLQ switch to terminate the NLQ mode does not change the print mode.
- The Emphasized mode has higher priority over the Condensed mode.
- If the Pica, Elite and Condensed modes are designated, the last input mode becomes valid.

| Print Mode | | Double-Strike | Double-Width | Emphasized | Superscript/ Subscript | Italic | Reverse |
|---|---|---|---|---|---|---|---|
| Draft | Pica | ○ | ○ | ○ | ○ | ○ | ○ |
| | Elite | ○ | ○ | ○ | ○ | ○ | ○ |
| | Condensed | ○ | ○ | ○ | ○ | ○ | ○ |
| NLQ | Pica | × | ○ | ○ | × | ○ | ○ |
| | Elite | × | ○ | ○ | × | ○ | ○ |

○: Possible combiation
×: Impossible combination

## OPERATING THE PRINTER

Refer to the computer's user's guide for the following information.

1. Operating the computer
2. Writing elementary programs in BASIC
3. Reading and writing files to and from a peripheral
4. Opening and closing files

# PRINTER-ASSOCIATED COMMANDS

Don't forget to push the RETURN key after you type in each command.

**OPEN, CMD, PRINT#, and CLOSE commands**

Try typing in the program below and running it:

```
10  OPEN 1, 4, 0
20  CMD 1
30  PRINT "I HAVE A PRINTER."
40  ? "A VERY NICE PRINTER."
50  PRINT#1, "GOD BLESS YOU."
60  CLOSE 1

RUN     RETURN

I HAVE A PRINTER.
A VERY NICE PRINTER.
GOD BLESS YOU.
```

Each line of the program is explained as follows.

```
10  OPEN 1, 4, 0
```

Opens File #1, and tells the computer that File #1 will talk to device #4 which is the device number of the printer. This device number is also called the primary address. When using the printer, it is usually 4 or 5. See the DIP switch 1 on your printer by which you can select either 4 or 5.
Remember that the number selected by the DIP switch 1 and the device number in line 10 must be the same.
0 is secondary address (sa) that is used to select a mode.

sa = 0: Graphic character mode (Cursor Up)
sa = 7: Business Character mode (Cursor Down)

If the sa is not specified in the OPEN command, sa = 0 is automatically set.

```
20  CMD 1
```

Commands the computer to send all PRINT statements to File #1. Line 10 has already specified with the device number 4 that this goes to the printer. Once the CMD command is given, the printer prints out "READY" and the line to the printer is left open to receive more commands. The printer given this command is said to be in the state of listening. Any LIST or PRINT command goes directly to the printer when it is listening.

```
30  PRINT
```

"I HAVE A PRINTER." is now sent to the printer, instead of the screen.

```
40  ?
```

You can use the abbreviation(?) for print statements, just like to the screen.

```
50  PRINT#1,
```

This is another way of sending information to File #1 for the printer. It also cancels the CMD1 status to close the line to the printer, so that now ordinary PRINT statements will go to the screen. This status for the printer is called "unlistening". You must always cancel the CMD status with a PRINT# before you close a file, as we do here and line 60.

**Note:** You cannot shorten PRINT#1 to ? #1. It must always be typed as PRINT# in full.

```
60  CLOSE 1
```

Closes the file you defined in line 10, so that you now cannot use CMD or PRINT# until you have OPENed a new file. If you have used CMD, then always remember to cancel the CMD status with a PRINT# statement before trying to CLOSE a file. 10 files are the maximum allowed to be left OPENed at a time so that make it a habit to close files after finishing with them.

Pressing the SHIFT and COMMODORE keys together on your computer will change the screen display back and forth between Cursor Up and Cursor Down. You can do the same on the printout by selecting a secondary address. Change line 10 to read:

```
10  OPEN 1, 4, 7

RUN     RETURN
i have a printer.
a very nice printer.
god bless you.
```

## LISTING A BASIC PROGRAM

Our previous example was entered and run as a program. But the OPEN, CMD, etc. work just as well as direct commands. Let us LIST out our program in the direct mode.

| | |
|---|---|
| OPEN 1, 4 | RETURN |
| CMD 1 | RETURN |
| LIST | RETURN |

and the printout of the stored program will be:

```
10 OPEN1,4,0
20 CMD1
30 PRINT "I HAVE A PRINTER."
40 PRINT "A VERY NICE PRINTER."
50 PRINT#1,"GOD BLESS YOU."
60 CLOSE1

READY.
```

Notice that "READY" is on the printer, not on the screen. You have not yet cancelled CMD and CLOSEd the file.

| | |
|---|---|
| PRINT#1 | RETURN |
| CLOSE 1 | RETURN |

Always PRINT# and CLOSE any files you may have had OPENed after a LIST or BREAK in running a program.

## PRINTING UNDER PROGRAM CONTROL

A BASIC program stored in the computer's memory can control the printer.

```
10 OPEN7,4
20 CMD7
30 PRINT "SUPERMAN"
40 PRINT "SUPERGIRL"
50 LIST
```

The following are printed if you run this program.

```
SUPERMAN
SUPERGIRL

10 OPEN7,4
20 CMD7
30 PRINT "SUPERMAN"
40 PRINT "SUPERGIRL"
50 LIST

READY.
```

**Note:** If your run a program including a LIST command as in the example above, the PRINT# command and the CLOSE command must follow to close, otherwise you may find a situation where you type in a new BASIC line, and RETURN, but the cursor doesn't go to the next line!

# SECONDARY ADDRESS EXPLANATIONS

The secondary address is valid only in CBM mode. DIP switch 3 must be moved to the OFF position before applying power.
If ASCII mode is selected, secondary address designations excluding 0 and 7 are ignored.
In order to perform each function, OPEN a file and issue PRINT# commands to that file to instruct the printer. Remember that a program can have 10 files simultaneously open.

- **SA=0: Printing in Graphic Character Mode**

This secondary address causes the printer to print in the Graphic Character mode (Cursor Up). This secondary address can be omitted because 0 is the default value.

```
10 OPEN4,4   :REM SAME AS OPEN4,4,0
20 PRINT#4,"SECONDARY ADDRESS 0"
30 FOR I=64 TO 95
40 PRINT#4,CHR$(I);
50 NEXT I
60 PRINT#4
70 CLOSE4
```

```
SECONDARY ADDRESS 0
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[£]↑←
```

- **SA=3: Setting a Page Length**

This secondary address sets the page length in the present line-pitch units. The CHR$(n) command following a PRINT# command designates the number of lines per page. When n is greater than 127, this command is ignored.
The paper position where the print head stays becomes the top of form when a PRINT#, CHR$(n) command is performed.

```
10 OPEN3,4,3  :REM SA=3
20 PRINT#3,CHR$(10) :REM 10 LINES PER PAGE
30 OPEN4,4
40 FOR I=1 TO 7
50 PRINT#4,"PAGE 1 LINE";I
60 NEXT I
70 PRINT#4,CHR$(12); :REM FORM FEED
80 FOR I=1 TO 3
90 PRINT#4,"PAGE 2 LINE";I
100 NEXT I
110 CLOSE3
120 CLOSE4
```

```
PAGE 1 LINE 1
PAGE 1 LINE 2
PAGE 1 LINE 3
PAGE 1 LINE 4
PAGE 1 LINE 5
PAGE 1 LINE 6
PAGE 1 LINE 7


PAGE 2 LINE 1
PAGE 2 LINE 2
PAGE 2 LINE 3
```

- **SA=6: Setting a Linefeed Pitch**

This secondary address designates a linefeed pitch of n/144 inch. In the Graphic mode, the linefeed pitch is automatically set as 7/72 inches regardless of this command. When the Graphic mode is terminated, the previous linefeed pitch will be valid.

```
10 OPEN4,4
20 OPEN6,4,6 :REM SA=6
30 PRINT#6,CHR$(16) :REM 16/144INCHES
40 FOR I=1 TO 4
50 PRINT#4,"HANDSOME HENRY"
60 NEXT I
70 PRINT#6,CHR$(24) :REM 24/144INCHES
80 FOR I=1 TO 4
90 PRINT#4,"BEAUTIFUL ELISABETH"
100 NEXT I
110 CLOSE4
120 CLOSE6
```

```
HANDSOME HENRY
HANDSOME HENRY
HANDSOME HENRY
HANDSOME HENRY
BEAUTIFUL ELISABETH
BEAUTIFUL ELISABETH
BEAUTIFUL ELISABETH
BEAUTIFUL ELISABETH
```

- **SA=7: Printing in Business Character Mode**

This secondary address causes the printer to print in the Business Character mode (Cursor Down).

```
10 OPEN7,4,7 :REM SA=7
20 PRINT#7,"SECONDARY ADDRESS 7"
30 FOR I=64 TO 95
40 PRINT#7,CHR$(I);
50 NEXT I
60 PRINT#7
70 CLOSE7
```

```
secondary address 7
@abcdefghijklmnopqrstuvwxyz[£]↑←
```

- **SA=10:Resetting the Printer**

This secondary address resets the printer. The NLQ mode remains unchanged if it is set. The print head does not move by performing this designation.

```
10 OPEN10,4,10 :REM SA=10
20 OPEN4,4
30 PRINT#4,CHR$(27);"M";:REM ELITE
40 PRINT#4,"ABCDEFGHIJKLM"
50 PRINT#4,"NOPQRSTUVWXYZ";
60 PRINT#10 :REM RESET
70 CLOSE10
80 PRINT#4,"ABCDEFGHIJKLM"
90 CLOSE4
```

```
ABCDEFGHIJKLM
ABCDEFGHIJKLM
```

- **SA=13: Designating Condensed Character Mode**

This secondary address designates the Condensed Character Mode.

```
10 OPEN13,4,13 :REM SA=13
20 PRINT#13 :REM CONDENSED CHARACTER
30 OPEN4,4
40 PRINT#4,"ATTRACTIVE LADY MAYUMI"
50 CLOSE4
60 CLOSE13
```

```
ATTRACTIVE LADY MAYUMI
```

# CONTROL CODE EXPLANATIONS

DIP switch 3 at the back of the printer selects CBM or ASCII mode.

## • Print Command

1. LF  CHR$(10)

**• In CBM mode:**

Input of this code initiates printing and then both a linefeed and carriage return are executed. The RVS ON, DOWN and UP codes are cleared but character modes are not.

```
10 OPEN4,4
20 PRINT#4,CHR$(18);:REM RVS ON
30 PRINT#4,CHR$(27);"G";:REM DOUBLE STRIKE
40 PRINT#4,"LINE ONE";CHR$(10);
50 PRINT#4,"LINE TWO";CHR$(10);
60 CLOSE4

RUN

LINE ONE
LINE TWO
```

**• In ASCII mode:**

Input of this code initiates printing and both a linefeed and carriage return are executed. The SO double-width command is cleared if it is set.

```
10 OPEN4,4
20 PRINT#4,CHR$(14);:REM SO DOUBLE WIDTH
30 PRINT#4,"LINE ONE";CHR$(10);
40 PRINT#4,"LINE TWO";CHR$(10);
50 CLOSE4


L I N E  O N E
LINE TWO
```

2. [CR] CHR$(13)

- **In CBM mode:**

Input of this code initiates printing and then both a linefeed and carriage return are performed. The [RVS ON], [DOWN], [UP] and [QUOTE] (") functions are cleared but character modes are not.

```
10 OPEN4,4
20 PRINT#4,CHR$(18);:REM RVS ON
30 PRINT#4,CHR$(27);"G";:REM DOUBLE STRIKE
40 PRINT#4,"LINE ONE";CHR$(13);
50 PRINT#4,"LINE TWO";CHR$(13);
60 CLOSE4
```

```
LINE TWO
```

- **In ASCII mode:**

Input of this code results in printing and a carriage return. DIP switch 2 determines whether a linefeed is performed. The [SO] double-width command is cleared.

```
10 REM DIP SWITCH 4 OFF
20 OPEN4,4
30 PRINT#4,CHR$(14);:REM SO DOUBLE WIDTH
40 PRINT#4,"LINE ONE";CHR$(13);
50 PRINT#4,"LINE TWO";CHR$(13);
60 CLOSE4
```

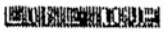
```
LINE ONE
LINE TWO
```

3. CS CHR$(141)

- **In CBM mode:**

Input of this code initaites printing and a carriage return. The RVS ON , DOWN and UP codes are all cleared but character modes are not.

```
10 OPEN4,4
20 PRINT#4,CHR$(18);:REM RVS ON
30 PRINT#4,CHR$(27);"G";:REM DOUBLE STRIKE
40 PRINT#4,"LINE ONE";CHR$(141);
50 PRINT#4,"LINE TWO";CHR$(141);
60 CLOSE4
```



- **In ASCII mode:**

The same as the CR code. Input of this code results in printing and a carriage return. DIP switch 2 determines whether a linefeed performed. The SO double-width command is cleared.

```
10 REM DIP SWITCH 4 OFF
20 OPEN4,4
30 PRINT#4,CHR$(14);:REM SO DOUBLE WIDTH
40 PRINT#4,"LINE ONE";CHR$(141);
50 PRINT#4,"LINE TWO";CHR$(141);
60 CLOSE4
```

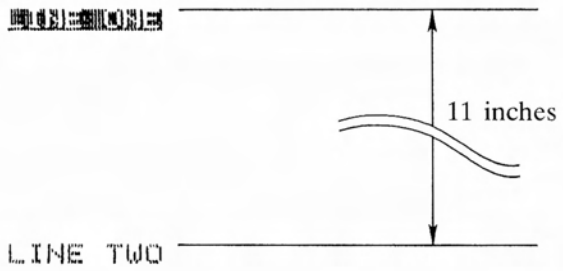
```
LINE ONE
LINE TWO
```

4. FF CHR$(12)

- **In CBM mode:**

Input of this code performs printing, a carriage return and a form feed. The RVS ON , DOWN and UP codes are cleared but character modes are not.

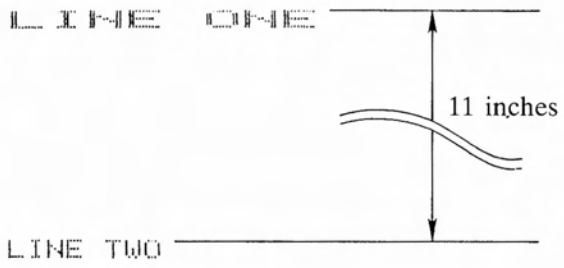
```
10 OPEN4,4
20 PRINT#4,CHR$(18);:REM RVS ON
30 PRINT#4,CHR$(27);"G";:REM DOUBLE STRIKE
40 PRINT#4,"LINE ONE";CHR$(12);
50 PRINT#4,"LINE TWO";CHR$(13);
60 CLOSE4
```




- **In ASCII mode:**

Input of this code performs printing, a carriage return and a form feed. The SO double-width command is cleared.

```
10 OPEN4,4
20 PRINT#4,CHR$(14);:REM SO DOUBLE WIDTH
30 PRINT#4,"LINE ONE";CHR$(12);
40 PRINT#4,"LINE TWO";CHR$(13);
50 CLOSE4
```



## • Double-Width Character/Condensed Character

5. SO CHR$(14)

**• In CBM Mode:**

Input of this command designates the Double-Width Character mode. The BS graphic printing mode is cleared.

```
10 OPEN4,4
20 PRINT#4,CHR$(8);:REM BS GRAPHIC
30 FOR I=129 TO 255
40 PRINT#4,CHR$(I);
50 NEXT I
60 PRINT#4,CHR$(14);"DOUBLE WIDTH"
70 PRINT#4,"CHARACTER"
80 PRINT#4,CHR$(15);"STANDARD CHARACTER"
90 CLOSE4
```

```
▒▒▒
```

6. SI CHR$(15)

- **In CBM mode:**

This code terminates the Double-Width Character mode. The BS graphic printing mode is cleared.

Refer to 5.

- **In ASCII mode:**

Input of this code designates the Condensed Character mode.

```
10 OPEN4,4
20 PRINT#4,CHR$(15);
30 PRINT#4,"CONDENSED CHARACTER"
40 PRINT#4,CHR$(18);:REM TERMINATION
50 PRINT#4,"STANDARD CHARACTER"
60 CLOSE4
```

```
CONDENSED CHARACTER
STANDARD CHARACTER
```

7. DC2 CHR$(18)

- **In CBM mode:**

Ignored.

- **In ASCII mode:**

Input of this code terminates the Condensed Character mode.

Refer to 6.

8. DC4 CHR$(20)

- **In CBM mode:**

Ignored.

- **In ASCII mode:**

Input of this command clears the Double-Width Character mode.

```
10 OPEN4,4
20 PRINT#4,CHR$(14);
30 PRINT#4,"DOUBLE WIDTH";
40 PRINT#4,CHR$(20);
50 PRINT#4," STANDARD"
60 CLOSE4
```

```
DOUBLE WIDTH STANDARD
```

## • Software Reset

9. ESC @ CHR$(27), CHR$(64)

- **In CBM Mode:**

Ignored.

- **In ASCII mode:**

This command places the printer in the same state as the power-on state except that DIP switch settings are not read and the NLQ mode remains unchanged if it is set.

```
10 OPEN4,4
20 PRINT#4,CHR$(27);"M";:REM ELITE
30 PRINT#4,"ABCDEFGHIJKLM"
40 PRINT#4,"NOPQRSTUVWXYZ";
50 PRINT#4,CHR$(27);"@";
60 PRINT#4,"ABCDEFGHIJKLM"
70 CLOSE4
```

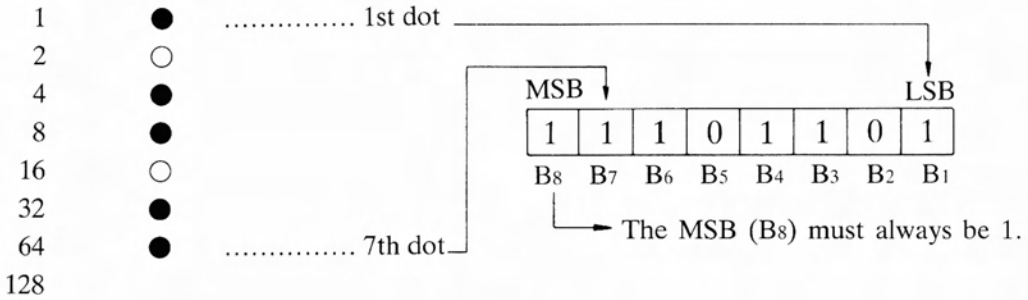
```
ABCDEFGHIJKLM
ABCDEFGHIJKLM
```

## • Graphic Printing/Back Space

10. BS CHR$(8)

**• In CBM mode:**

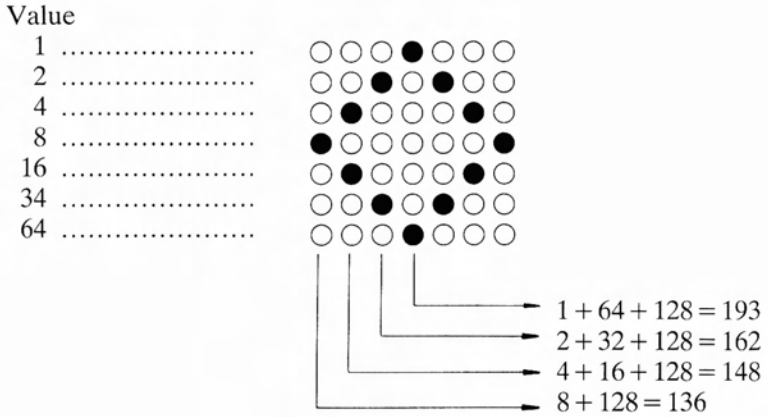
This specifies the input of graphics data in the form of 7-dot vertical columns. This allows you to design and print any graphics you like. The uppermost dot, 1st dot, is represented by the least significant bit ($B_1$), and the lowermost dot, 7th dot, is represented by the bit ($B_7$).




The linefeed pitch in this graphic printing mode is 7/72 inches, so that the patterns printed then appear continuous. There are 480 dot-columns in a line, each 7 dots high. The SI and SO codes clear the graphic printing mode, In this mode, all the codes in the range of 0~127 except the POS , ESC POS , SUB , LF , CR , FF , SO , SI , and DC3 codes are ignored.

Example:

Following is an example of printing a small diamond five times.



```
10 OPEN4,4
20 PRINT#4,CHR$(8);
30 FOR I=1 TO 5
40 PRINT#4,CHR$(136);CHR$(148);CHR$(162);
50 PRINT#4,CHR$(193);CHR$(162);CHR$(148);CHR$(136)
60 NEXT I
70 PRINT#4,CHR$(15);:REM TERMINATION
80 CLOSE4
```

If you break the program during the graphic printing mode by pressing the RUN/ STOP key, the printer may still be in the mode where it will ignore text and advance by the smaller linefeeds. You should clear this by:

```
PRINT #1, CHR$(15)
CLOSE 1
```

or by powering down the printer.

- **In ASCII mode:**

After printing the contents of the buffer, the printing initiation postion is moved to the left by a current single character width, allowing characters to be overlapped.

```
10 OPEN4,4
20 FOR 1=1 TO 2
30 PRINT#4,"ABCDEFGHIJKLM";
40 PRINT#4,CHR$(8);
50 PRINT#4,"MNO"
60 PRINT#4,CHR$(14);:REM DOUBLE WIDTH
70 NEXT I
80 CLOSE4
```

```
ABCDEFGHIJKLMNO
ABCDEFGHIJKLMNO
```

11. SUB | n1 | n2 — CHR$(26) CHR$(n1) CHR$(n2)
(Valid only in CBM mode)

Input of this code prints repeatedly any given single column of graphics data. n1 is the data showing the number of times the graphics data is to be repeated. n2 is the graphics data itself (data for one column only). n1=0 means the graphics data is to be repeated 256 times. This is particularly useful for bar charts. This code is valid only in the BS graphic printing mode and ignored in other modes.

This 3-byte code is ignored if n2 is smaller than 128.

```
10 OPEN4,4
20 PS$="        "
30 FOR I=1 TO 6
40 READ M
50 PRINT#4,M;PS$;CHR$(8);:REM BS GRAPHIC
60 PRINT#4,CHR$(255);
70 PRINT#4,CHR$(26);CHR$(M);CHR$(193);
80 PRINT#4,CHR$(255);
90 PRINT#4,CHR$(15):REM TERMINATION
100 NEXT I
110 DATA 100,115,130,160,205,255
120 CLOSE4
```

```
100
115
130
160
205
255
```

## • Print Character

12. UP CHR$(145) (Valid only in CBM mode)

Input of this code designates the Graphic character mode (Cursor UP mode). Refer to the character table for the Graphic Character mode on page 61. The CR , LF or FF code cancels this mode and returns to the previous mode that was specified by the secondary address 0 or 7 in the OPEN command.

```
10 OPEN4,4,7
20 PRINT#4,"CURSOR DOWN 1"
30 PRINT#4,CHR$(145);"CURSOR UP 1   ";
40 PRINT#4,CHR$(17);"CURSOR DOWN 2"
50 PRINT#4,CHR$(145);"CURSOR UP 2"
60 PRINT#4,"CURSOR DOWN 3 BY LF"
70 CLOSE4
```

```
cursor down 1
CURSOR UP 1   cursor down 2
CURSOR UP 2
cursor down 3 by lf
```

13. DOWN CHR$(17) (Valid only in CBM mode)

Input of this command designates the Business character mode (Cursor DOWN mode). Refer to the character table for the Business character mode on page 62. The CR , LF or FF code cancels this mode and returns to the previous mode that was specified by the secondary address 0 or 7 in the OPEN command.

Refer to 12.

## • Reverse Character

14. RVS ON  CHR$(18)  (Valid only in CBM mode)

The Reverse Character mode is turned on by inputting this command to print white characters on black background. This code is terminated by the CR , LF or FF code. This code is ignored either in the BS graphic printing mode or the NLQ mode.

```
10 OPEN4,4
20 PRINT#4,CHR$(18);
30 PRINT#4,"  REVERSE ON  "
40 PRINT#4,"REVERSE IS OFF BY A PRINT COMMAND"
50 CLOSE4
```

```
[REVERSE ON]
REVERSE IS OFF BY A PRINT COMMAND
```

15. RVS OFF  CHR$(146)  (Valid only in CBM mode)

Input of this code terminates the Reverse Character mode.

```
10 OPEN4,4
20 PRINT#4,"NORMAL";
30 PRINT#4,CHR$(18);
40 PRINT#4,"  REVERSE ON  ";
50 PRINT#4,CHR$(146);
60 PRINT#4,"REVERSE OFF"
70 CLOSE4
```

```
NORMAL[REVERSE ON]REVERSE OFF
```

16. QUOTE CHR$(34) (Valid only in CBM mode)

When input codes 0~31 and 128~159 are sandwiched in between either CHR$(34) and CHR$(34), or CHR$(34) and CHR$(13), the input codes (0~31, 128~159) will, respectively, print out reversed characters of (64~95, 192~223). In other words, when an odd number of quotation marks [CHR$(34)] has been transmitted, control codes that follow are made visible. This can be particularly useful when listing a BASIC program which contains control characters in quotation marks. The CR code, or CHR$(13) always performs a carriage return.

**Example 1:** Printing quotation marks around particular characters

```
10 OPEN4,4
20 PRINT#4,CHR$(34);"NICE PRINTER";CHR$(34)
30 PRINT#4,"NICE PRINTER"
40 CLOSE4
```

```
"NICE PRINTER"
NICE PRINTER
```

**Example 2:** Graphic Character Mode (Cursor Up)

```
100 REM CONTROL CHARACTERS
110 PRINT"■ HOME"
120 PRINT"■ CLR"
130 PRINT"■ CRSR DOWN"
140 PRINT"■ CRSR UP"
150 PRINT"■ CRSR RIGHT"
160 PRINT"■ CRSR LEFT"
170 PRINT"■ RVS ON"
180 PRINT"■ RVS OFF"
190 PRINT"■ F1"
200 PRINT"■ F3"
210 PRINT"■ F5"
220 PRINT"■ F7"
230 PRINT"■ F2"
240 PRINT"■ F4"
250 PRINT"■ F6"
260 PRINT"■ F8"
270 PRINT"■ BLACK"
280 PRINT"■ WHITE"
290 PRINT"■ RED"
300 PRINT"■ CYAN"
310 PRINT"■ PURPLE"
320 PRINT"■ GREEN"
330 PRINT"■ BLUE"
340 PRINT"■ YELLOW"
350 REM COMMODORE 64
360 PRINT"■ ORANGE"
370 PRINT"■ BROWN"
380 PRINT"■ LIGHT RED"
390 PRINT"■ DARK GREY"
400 PRINT"■ MED GREY"
410 PRINT"■ LIGHT GREEN"
420 PRINT"■ LIGHT BLUE"
430 PRINT"■ LIGHT GREY"
440 OPEN4,4:CMD4:LIST
```

**Example 3:** Business Character Mode (Cursor Down)

```
100 rem control characters
110 print"■ home"
120 print"■ clr"
130 print"■ crsr down"
140 print"■ crsr up"
150 print"■ crsr right"
160 print"■ crsr left"
170 print"■ rvs on"
180 print"■ rvs off"
190 print"■ f1"
200 print"■ f3"
210 print"■ f5"
220 print"■ f7"
230 print"■ f2"
240 print"■ f4"
250 print"■ f6"
260 print"■ f8"
270 print"■ black"
280 print"■ white"
290 print"■ red"
300 print"■ cyan"
310 print"■ purple"
320 print"■ green"
330 print"■ blue"
340 print"■ yellow"
350 rem commodore 64
360 print"■ orange"
370 print"■ brown"
380 print"■ light red"
390 print"■ dark grey"
400 print"■ med grey"
410 print"■ light green"
420 print"■ light blue"
430 print"■ light grey"
440 open7,4,7:cmd7:list
```

## • Print Start Postition

17. | POS | n1 | n2 | CHR$(16) "n1 n2" (Valid only in CBM mode)

Input of this code specifies the print position in standard character units away from the left margin. n1 n2 are ASCII codes for a 2-digit decimal number. When the specified position exceeds the right margin, the 3-byte code is ignored.
The left margin position is specified by CHR$(16) "00".

```
10 OPEN4,4
20 PRINT#4,"12345678901234567890"
30 PRINT#4,CHR$(16);"10";
40 PRINT#4,"POSITION 10TH"
50 CLOSE4
```

```
12345678901234567890
          POSITION 10TH
```

18. | ESC | POS | n1 | n2 | CHR$(27) CHR$(16) CHR$(n1) CHR$(n2) (Valid only in CBM mode)

Input of this code specifies the print position in 1/60-inch units away from the left margin. n1 n2 are binary numbers.
When the specified position exceeds the right margin, the 4-byte code is ignored.
The print position is calculated by (n1 × 256 + n2) × 1/60 inches.

```
10 OPEN4,4
20 PRINT#4,"123456789012345678901234567890"
30 PRINT#4,CHR$(27);CHR$(16);CHR$(0);CHR$(137);
40 PRINT#4,"SPLENDID HENRY"
50 CLOSE4
```

```
12345678901234567890123456789O
                          SPLENDID HENRY
```

## • Italic Character

19. ESC 4 CHR$(27) "4"

Input of this code designates the Italic Character mode. Graphic Character and reverse characters cannot be printed in italics.

```
10 OPEN7,4
20 CMD7
30 PRINT "NORMAL CHARACTER 1"
40 PRINT CHR$(27);"4";:REM ITALIC
50 PRINT "ITALIC CHARACTER"
60 PRINT CHR$(27);"5";:REM CLEAR
70 PRINT "NORMAL CHARACTER 2"
80 PRINT#7
90 CLOSE7
```

```
NORMAL CHARACTER 1
ITALIC CHARACTER
NORMAL CHARACTER 2
```

20. ESC 5 CHR$(27) "5"

This code clears the Italic Character mode.

Refer to 19.

## • Underline

**21.** [ESC][−][1] CHR$(27) "−" CHR$(1) or CHR$(27) "−1"

This code specifies the setting of underlining for all characters that follow.

```
10 OPEN7,4
20 CMD7
30 PRINT "NO UNDERLINE CHARACTER 1"
40 PRINT CHR$(27);"-";CHR$(1);:REM UNDERLINE
50 PRINT "UNDERLINE CHARACTER"
60 PRINT CHR$(27);"-";CHR$(0);:REM TERMINATION
70 PRINT "NO UNDERLINE CHARACTER 2"
80 PRINT#7
90 CLOSE7
```

```
NO UNDERLINE CHARACTER 1
UNDERLINE CHARACTER
NO UNDERLINE CHARACTER 2
```

22. [ESC][−][00] CHR$(27) "−" CHR$(0) or CHR$(27) "−0"

This code performs the termination of underlining.

Refer to 21.

## • Skip-Over Perforation

23. DC3 CHR$(19)

This code terminates the Skip-Over perforation mode.

24. DC3 CHR$(147)

This code sets the Skip-Over perforation mode. A form feed to the top of the next page is automatically performed when the remaining lines on the present page is less than 6.

```
10 OPEN3,4,3
20 PRINT#3,CHR$(8);:REM PAGE LENGTH 8 LINES
30 CLOSE3
40 OPEN4,4
50 CMD4
60 PRINT CHR$(12);:REM FORM FEED
70 PRINT CHR$(147);
80 FOR I=1 TO 5
90 PRINT I
100 NEXT I
110 PRINT CHR$(19);:REM TERMINATION
120 FOR J=1 TO 10
130 PRINT J
140 NEXT J
150 PRINT#4
160 CLOSE4
```

## • Print Direction

25. | ESC | U | 01 | CHR$(27) "U" CHR$(1) or CHR$(27) "U1"

This code selects unidirectional printing from left to right. Greater precision on horizontal dot registration can be achieved in this mode.

26. | ESC | U | 00 | CHR$(27) "U" CHR$(0) or CHR$(27) "U0"

This code selects bidirectional printing.

```
10 OPEN4,4
20 CMD4
30 PRINT CHR$(27);"U1";:REM UNIDIRECTIONAL
40 PRINT "---------->"
50 PRINT "---------->"
60 PRINT "---------->"
70 PRINT CHR$(27);"U0";:REM BIDIRECTIONAL
80 PRINT "<----------"
90 PRINT "---------->"
100 PRINT "<----------"
110 PRINT "---------->"
120 PRINT#4
130 CLOSE4
```

```
---------->
---------->
---------->
<----------
---------->
<----------
---------->
```

## • Double-Strike Character

27. ESC G CHR$(27) "G"

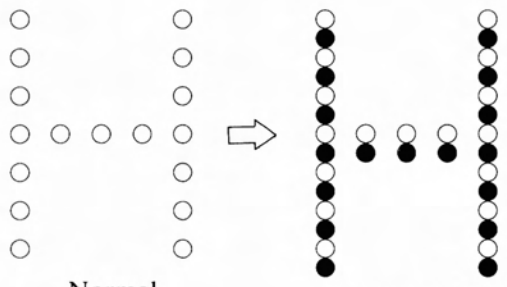
This code selects the Double-Strike character mode.

28. ESC H CHR$(27) "H"

This code terminates the Double-Strike character mode.

```
10 OPEN4,4
20 CMD4
30 PRINT CHR$(27);"G";
40 PRINT "DOUBLE STRIKE CHARACTER"
50 PRINT CHR$(27);"H";
60 PRINT "NORMAL CHARACTER"
70 PRINT#4
80 CLOSE4
```

```
DOUBLE STRIKE CHARACTER
NORMAL CHARACTER
```



Normal Double-Strike

## • Character Pitch

29. ESC M CHR$(27) "M"

This code selects the elite character pitch (12 characters per inch).

30. ESC P CHR$(27) "P"

This code selects the pica character pitch (10 characters per inch).

```
10 OPEN4,4
20 CMD4
30 PRINT CHR$(27);"M";
40 PRINT "ELITE CHARACTER PITCH"
50 PRINT CHR$(27);"P";
60 PRINT "PICA CHARACTER PITCH"
70 PRINT#4
80 CLOSE4
```

```
ELITE CHARACTER PITCH
PICA CHARACTER PITCH
```

## • Marging Setting

31. ESC l n  CHR$(27) CHR$(108) CHR$(n)

This code sets the left margin.
n selects the column number using the present character width as the base. This code is ignored if the value of n exceeds the right margin or a single line. This code is also ignored if the width between the left and right margins is less than 2 pica Double-Width characters.

```
10 OPEN4,4
20 CMD4
30 PRINT "123456789012345678901"
40 PRINT CHR$(27);CHR$(108);CHR$(10);
50 PRINT "LEFT MARGIN SETTING"
60 PRINT#4
70 CLOSE4
```

```
123456789012345678901
          LEFT MARGIN SETTING
```

32 ESC Q n  CHR$(27) "Q" CHR$(n)

This code sets the right margin.
n selects the column number using the present character width as the base. This code is ignored if the value of n exceeds a single line or if the width between the left and right margins is less than 2 pica Double-Width characters.

```
10 OPEN4,4
20 CMD4
30 PRINT "123456789012345678901"
40 PRINT CHR$(27);"Q";CHR$(15);
50 PRINT "RIGHT MARGIN SETTING"
60 PRINT#4
70 CLOSE4
```

```
123456789012345678901
RIGHT MARGIN SE
TTING
```

## • Superscript and Subscript

33. ESC | S | 00 CHR$(27) "S" CHR$(0) or CHR$(27) "S0"

This code selects the superscript character mode.

```
10 OPEN4,4
20 CMD4
30 PRINT "NORMAL CHARACTER ";
40 PRINT CHR$(27);"S0";
50 PRINT "SUPERSCRIPT ";
60 PRINT CHR$(27);"T";
70 PRINT "NORMAL CHARACTER"
80 PRINT#4
90 CLOSE4
```

```
NORMAL CHARACTER SUPERSCRIPT NORMAL CHARACTER
```

34. ESC | S | 01 CHR$(27) "S" CHR$(1) or CHR$(27) "S1"

This code selects the subscript character mode.

```
10 OPEN4,4
20 CMD4
30 PRINT "NORMAL CHARACTER ";
40 PRINT CHR$(27);"S1";
50 PRINT "SUBSCRIPT ";
60 PRINT CHR$(27);"T";
70 PRINT "NORMAL CHARACTER"
80 PRINT#4
90 CLOSE4
```

```
NORMAL CHARACTER SUBSCRIPT NORMAL CHARACTER
```

35. ESC | T CHR$(27) "T"

This code terminates the superscript/subscript character mode.

## • Near Letter Quality

36. | ESC | x | 01 |

CHR$(27) CHR$(120) CHR$(01) or CHR$(27) CHR$(120) "1"

This code selects the Near Letter Quality (NLQ) print mode.

37. | ESC | x | 00 |

CHR$(27) CHR$(120) CHR$(00) or CHR$(27) CHR$(120) "0"

This code terminates the Near Letter Quality (NLQ) print mode.

```
10 OPEN4,4
20 CMD4
30 PRINT CHR$(27);CHR$(120);CHR$(1);
40 PRINT "NLQ PRINT MODE"
50 PRINT CHR$(27);CHR$(120);CHR$(0);
60 PRINT "NLQ PRINT MODE IS TERMINATED"
70 PRINT#4
80 CLOSE4
```

```
NLQ PRINT MODE
NLQ PRINT MODE IS TERMINATED
```

## • Linefeed Pitch

38. ESC 3 n — CHR$(27) "3" CHR$(n)
$0 \leq n \leq 255$

This code sets the linefeed pitch to n/216 inch.
In the graphic mode, however, the linefeed pitch is automtaically set to 7/72 inche:
This code becomes valid when the graphic mode is terminated.

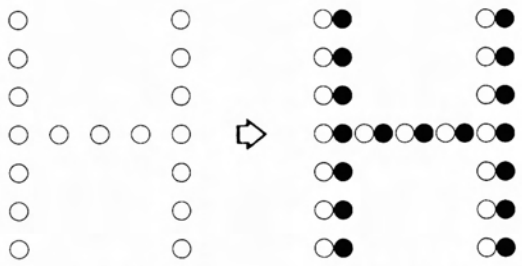
```
10 OPEN4,4
20 CMD4
30 FOR I=23 TO 79 STEP 7
40 PRINT CHR$(27);"3";CHR$(I);
50 PRINT "N/216 INCH LINEFEED"
60 NEXT I
70 PRINT#4
80 CLOSE4
```

```
N/216 INCH LINEFEED
N/216 INCH LINEFEED
N/216 INCH LINEFEED
N/216 INCH LINEFEED
N/216 INCH LINEFEED
N/216 INCH LINEFEED
N/216 INCH LINEFEED
N/216 INCH LINEFEED
N/216 INCH LINEFEED
```

## • Emphasized Character (Bold)

39. ESC E CHR$(27) "E"

Input of this command designates the Emphasized Character mode.




40. ESC F CHR$(27) "F"

Input of this command terminates the Emphasized Character mode.

```
10 OPEN4,4
20 CMD4
30 PRINT CHR$(27);"E";
40 PRINT "EMPHASIZED CHARACTER"
50 PRINT CHR$(27);"F";
60 PRINT "NORMAL CHARACTER"
70 PRINT#4
80 CLOSE4
```

```
EMPHASIZED CHARACTER
NORMAL CHARACTER
```

## • Double-Width Character

41. ESC W 1

CHR$(27) CHR$(87) CHR$(1), or CHR$(27) CHR$(87) "1"

Input of this command designates the Double-Width Character mode which is not terminated by a linefeed.

42. ESC W 0

CHR$(27) CHR$(87) CHR$(0), or CHR$(27) CHR$(87) "0"

Input of this command terminates the Double-Width Character mode which is designated either by the ESC W 1 or SO command.

```
10 OPEN4,4
20 CMD4
30 PRINT CHR$(27);"W1";
40 PRINT "DOUBLE WIDTH CHARACTER"
50 PRINT "DOUBLE WIDTH CHARACTER"
60 PRINT CHR$(27);"W0";
70 PRINT "STANDARD CHARACTER"
80 PRINT#4
90 CLOSE4
```

```
DOUBLE WIDTH CHARACTER
DOUBLE WIDTH CHARACTER
STANDARD CHARACTER
```

# TROUBLESHOOTING

Use the table below to diagnose any problems that may occur. If you cannot solve the problem, try to decide what part of your system is not working properly and consult your dealer.

| PROBLEM | CAUSE AND REMEDY |
|---|---|
| The printer does not print.<br>The POWER lamp does not light. | 1) Power is not getting to the printer.<br>• Check the power cord and power switch. |
| The printer does not print.<br>The POWER lamp is lit. | 1) The connection to the computer is not correct.<br>• Make sure that the cable connecting the printer and computer is correctly connected.<br>2) DIP switch 1 is not properly set.<br>• Properly set it. |
| The printer is operating properly, but the paper is not feeding through properly. | 1) The paper is jammed in the printer.<br>• Remove the paper and reinsert it properly. |
| The print is light or smeared. | 1) The printhead position is not correct.<br>• Move the head adjustment lever to match the paper being used.<br>2) The ribbon cassette is not properly installed.<br>• Properly install the cassette.<br>3) The ink ribbon is old or is worn out.<br>• Replace the old ribbon cassette with a new one. |
| The NLQ lamp is blinking. | 1) An error condition has been detected.<br>• Turn power off and then back on again. |

# APPENDIX A (Glossary)

**ASCII**

American Standard Code for Information Interchange.
This code consists of binary numbers and decimal numbers to represent characters and control codes.

**Example:**

| ASCII Character | Hex | Decimal |
|---|---|---|
| A | 41 | 65 |
| B | 42 | 66 |
| C | 43 | 67 |
| 0 (Zero) | 30 | 48 |
| 2 | 32 | 50 |
| 4 | 34 | 52 |

**baud rate**

A measure of the data transmission speed.
One baud is equivalent to one bit per second.

**BASIC**

Beginner's All-Purpose Symbolic Instruction Code.
A high level programming language designed for ease of use. It is now a standard programming language for microcomputers.

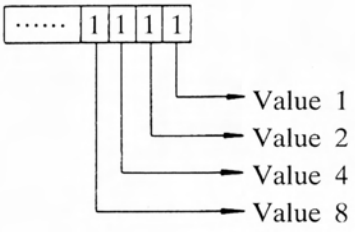
**bidirectional printing**

The printing direction of consecutive lines is alternated to speed up the printing.

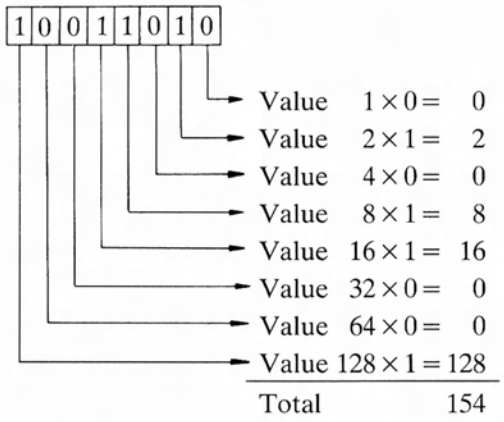
**binary**

A base 2 number system using only the digits zero (0) and one (1). The right most digit of a binary number has a value of 1, the next a value of 2, then 4, 8, and so on.

**Binary number:**



**Example:**




**bit** An abbreviation for binary digit.
Each bit is either zero or one.

**buffer** Storage memory which keeps input data temporarily until it can be printed.

**byte** One byte is made up of 8 bits.

**carriage return** The control character that makes a printer start a new line.

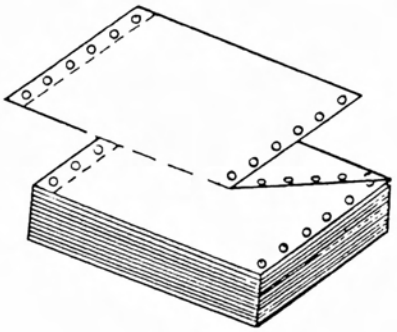
**character** Any symbol that represents a digit, letter, or other symbols.

**commands** Orders used to tell the printer to perform something.

**condensed** Printing in which each character is narrower than Pica or Elite character.

```
PICA        ;ABCDEFGHIJKLMN
ELITE       ;ABCDEFGHIJKLMN
CONDENSED   ;ABCDEFGHIJKLMN
```

**continuous forms** Perforated fanfold paper with sprocket holes along both sides, allowing the tractor to pull the paper through the printer.



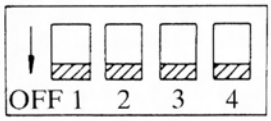
**CPI** Characters Per Inch

**CPS** Characters Per Second

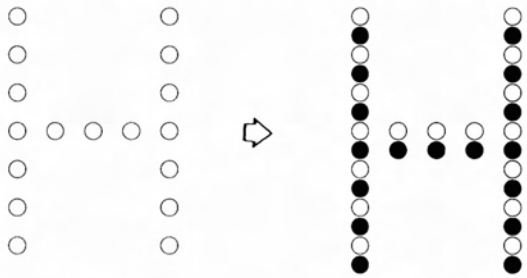
**data** Encoded information that can be processed or produced by a computer.

**decimal** The numbering system that uses the numerals 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

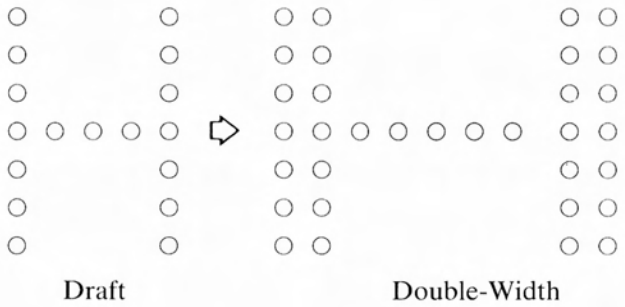
**DIP switch** Dual In-line Package.
A set of small switches inside the printer.




**double-strike printing** Characters are printed twice for greater intensity. In the second pass printing, the dots are printed slightly below the initial dots.




**double-width** A feature allowing to double the width of the Draft character: 10 CPI (Pica) becomes 5 CPI.

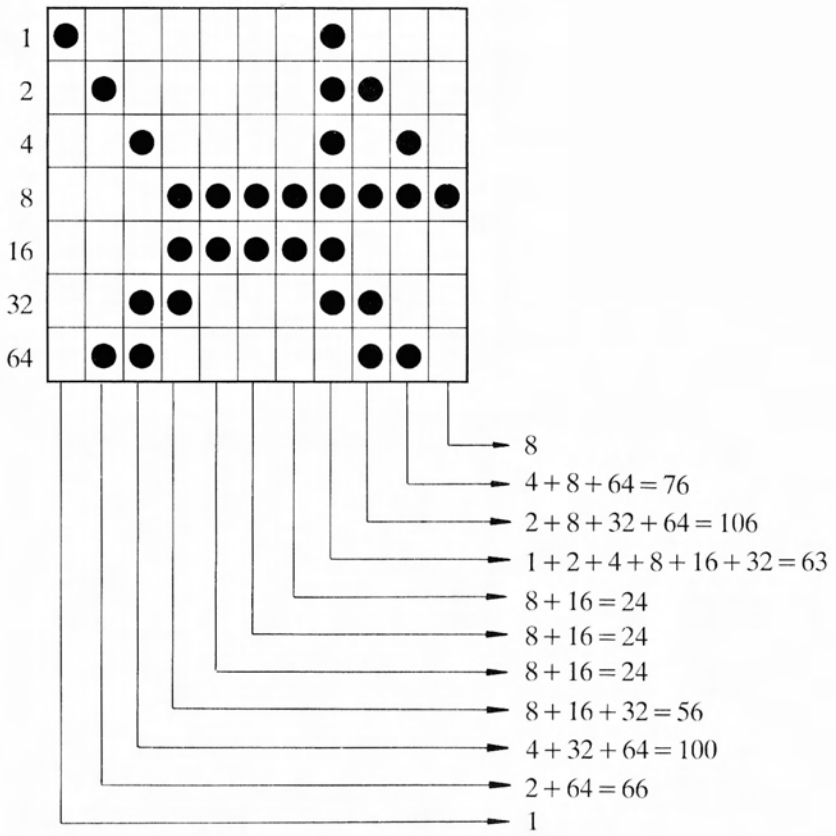


**elite** A term used to describe 12 cpi printing.

**form feed** The control code or the switch that moves the paper up to the top the next page.

**friction feed** Advancing paper by using pressure on the paper to pull it through the printer.

**grapics printing** Information printed as charts, pictures or drawings which are composed of dots for the printer.



**hex or hexadecimal**

A numbering system that uses a base of 16.
Letters A to F are, respectively, representing numbers 10 to 15.

**Example:**

| Hexadecimal | Decimal | Binary |
|---|---|---|
| 0 | 0 | 0000 |
| 1 | 1 | 0001 |
| 2 | 2 | 0010 |
| 3 | 3 | 0011 |
| 4 | 4 | 0100 |
| 5 | 5 | 0101 |
| 6 | 6 | 0110 |
| 7 | 7 | 0111 |
| 8 | 8 | 1000 |
| 9 | 9 | 1001 |
| A | 10 | 1010 |
| B | 11 | 1011 |
| C | 12 | 1100 |
| D | 13 | 1101 |
| E | 14 | 1110 |
| F | 15 | 1111 |

**input**

Information received by a computer or the printer from outside.

**interface**

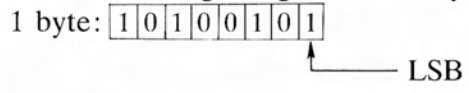
A conversion which provides communication between the computer and the printer.
Parallel and serial interfaces are the 2 basic connections.

**line feed**

The control character or the switch that moves the paper forward by one line.

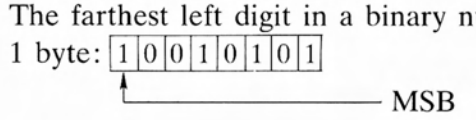
**LSB**

Least Significant Bit.
The farthest right digit in a binary number.



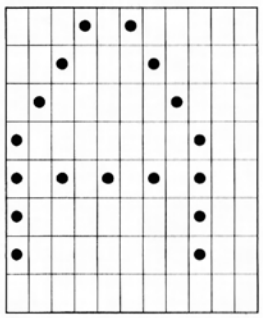

**MSB**

Most Significant Bit.
The farthest left digit in a binary number.

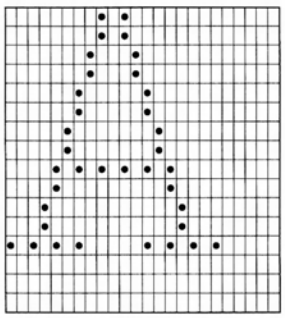


**NLQ**

Near Letter Quality.
A style of printing that allows much better definition than Draft quality.



Draft



NLQ

**off-line**

Not having direct interaction with a computer. In the off-line mode, the printer cannot receive any data from a computer.

**on-line**

When the printer is in on-line mode, the computer connected can transmit data to the printer.

**output**

Information printed out on paper by the printer or transmitted by a computer to the printer.

**parallel interface**

A data transmission which has a separate wire for each of the data bits: Therefore, 8 bits (1 byte) can be transmitted at the same time.

**pica**

A term used to describe 10 cpi printing.

**pin feed**

A system which moves paper through the printer using pins. They engage in holes along the edges of the paper.

**protocol**

A protocol, which is a set of rules for serial communication, determines how data is transmitted and received between a computer and the printer.

**RAM**

Random Access Memory
This temporary memory is random because it provides immediate access to any storage location in the memory. Data may be written in or read out while the power is supplied. Data stored will be lost once the power is turned off.

**ROM** — Read Only Memory
A memory where data is stored permanently or semi-permanently and can be read out, but not altered in operation.

**serial interface** — A data transmission in which data is sent bit by bit sequentially over a pair of wires with start and stop bits to indicate the beginning and end of each byte.

**tab** — Commands the printer to start printing at a certain location. There are 2 such commands: horizontal tab and vertical tab.

**TOF** — Top of Form
The location on a page where the first line of printing will appear.

**unidirectional printing** — All printing is performed from left to right.

# APPENDIX B (Specifications)

## 1. SPECIFICATIONS

| | |
|---|---|
| • Dimensions | W407 × H117 × D300mm (Paper separator, printer cover and paper feed knob included) |
| • Weight | Approximately 4.2kg |
| • Temperature | 5~35°C, during operation |
| • Humidity | 20~80%, during operation (No condensation) |
| • Power Supply | 120VAC for USA and Canada<br>220/240VAC for Europe |
| • Power Consumption | 20 watts (Self test printing)<br>9 watts (Stand-by) |

## 2. PRINTING SPECIFICATIONS

| | | |
|---|---|---|
| • Print Method | Impact Dot Matrix (Bi-directional Logic Seeking) | |
| • Print Head | 9-pin | |
| • Character Category | 104 characters, 68 graphic elements | |
| • Graphic Printing | Any combination of 7 dots in a vertical column<br>Maximum 480 dot columns/line | |
| • Print Mode | Pica | 10 CPI |
| | Elite | 12 CPI |
| | Condensed | 17 CPI |
| | NLQ Pica | 10 CPI |
| | NLQ Elite | 12 CPI |
| | Graphic Printing | |

Mixing any of the above modes within a single line is possible.
When changing modes, data already input is printed in the previous mode, then the printer changes modes to receive new data.
In addition, this printer is capable of Double-Strike, Double-Width, Superscript/Subscript, and Reverse Character modes.

| | | |
|---|---|---|
| • Paper Feed Method | Friction method<br>Tractor method | |
| • Line Feed Pitch | Minimum of 1/216 inch | |
| • Throughput | Draft 50 LPM<br>NLQ 11 LPM | |
| • Printing Forms | Paper width | 4 inches – 10 inches |
| | Paper thickness | 14 – 21 lbs. in U.S.A.<br>(53 g/m$^2$ – 81 g/m$^2$)<br>0.07 mm – 0.1 mm |
| • Multiple Copies | Original plus 2. non-carbon<br>Total thickness of less than 0.2 mm | |
| • Ribbon | Cassette style, single color (Black) | |

# APPENDIX C
## (Character Category Specifications)

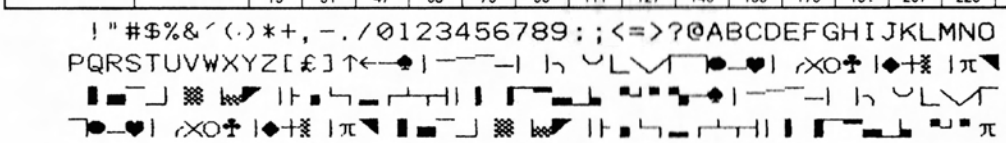
| Character Category | | | Character Structure H × V | Maximum Column Number | Character Spacing (CPI) | Print Speed (CPS) | Dot Spacing H × V inch | Number of Passes |
|---|---|---|---|---|---|---|---|---|
| Standard Character | Draft | Pica | 6 × 9 | 80 | 10 | 100 | 1/60 × 1/72 | 1 |
| | | Elite | 6 × 9 | 96 | 12 | 50 | 1/72 × 1/72 | 1 |
| | | Condensed | 7 × 9 | 137 | 17 | 70 | 1/120 × 1/72 | 1 |
| | NLQ | Pica | 12 × 18 | 80 | 10 | 20 | 1/120 × 1/144 | 2 |
| | | Elite | 12 × 18 | 96 | 12 | 24 | 1/144 × 1/144 | 2 |
| Italic Character | Draft | Pica | *16 × 9 | 80 | 10 | 100 | *1/240 × 1/72 | 1 |
| | | Elite | *16 × 9 | 96 | 12 | 50 | *1/288 × 1/72 | 1 |
| | | Condensed | *18 × 9 | 137 | 17 | 70 | *1/240 × 1/72 | 1 |
| | NLQ | Pica | 16 × 18 | 80 | 10 | 20 | *1/480 × 1/144 | 2 |
| | | Elite | 16 × 18 | 96 | 12 | 24 | *1/576 × 1/144 | 2 |
| Graphic Printing | | | n × 7 | 480 dots/line | — | 600 col/sec | 1/60 × 1/72 | 1 |
| Reverse Character | | Pica | 6 × 8 | 80 | 10 | 100 | 1/60 × 1/72 | 1 |
| | | Elite | 6 × 8 | 96 | 12 | 50 | 1/72 × 1/72 | 1 |
| | | Condensed | 7 × 8 | 137 | 17 | 70 | 1/120 × 1/72 | 1 |

* Includes half dots

# APPENDIX D (Code Table)

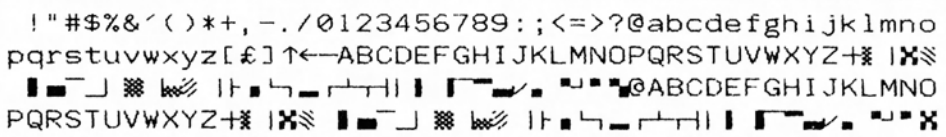
## CBM Standard Font in Graphic Character Mode (Cursor Up)

| Upper Bit / Lower Bit | Hex. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hex. | Binary | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | | POS | SP | ø | @ | P | | | | | SP | | | | SP | |
| | | 0 | 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 | 144 | 160 | 176 | 192 | 208 | 224 | 240 |
| 1 | 0001 | | CURSOR DOWN | ! | 1 | A | Q | ♠ | ● | | CURSOR UP | | | ♠ | ● | | |
| | | 1 | 17 | 33 | 49 | 65 | 81 | 97 | 113 | 129 | 145 | 161 | 177 | 193 | 209 | 225 | 241 |
| 2 | 0010 | | RVS ON | " | 2 | B | R | | | | RVS OFF | | | | | | |
| | | 2 | 18 | 34 | 50 | 66 | 82 | 98 | 114 | 130 | 146 | 162 | 178 | 194 | 210 | 226 | 242 |
| 3 | 0011 | | DC3 | # | 3 | C | S | | ♥ | | DC3 | | | | ♥ | | |
| | | 3 | 19 | 35 | 51 | 67 | 83 | 99 | 115 | 131 | 147 | 163 | 179 | 195 | 211 | 227 | 243 |
| 4 | 0100 | | | $ | 4 | D | T | | | | | | | | | | |
| | | 4 | 20 | 36 | 52 | 68 | 84 | 100 | 116 | 132 | 148 | 164 | 180 | 196 | 212 | 228 | 244 |
| 5 | 0101 | | | % | 5 | E | U | | | | | | | | | | |
| | | 5 | 21 | 37 | 53 | 69 | 85 | 101 | 117 | 133 | 149 | 165 | 181 | 197 | 213 | 229 | 245 |
| 6 | 0110 | | | & | 6 | F | V | | | | | | | | | | |
| | | 6 | 22 | 38 | 54 | 70 | 86 | 102 | 118 | 134 | 150 | 166 | 182 | 198 | 214 | 230 | 246 |
| 7 | 0111 | | | ' | 7 | G | W | | | | | | | | | | |
| | | 7 | 23 | 39 | 55 | 71 | 87 | 103 | 119 | 135 | 151 | 167 | 183 | 199 | 215 | 231 | 247 |
| 8 | 1000 | BS | | ( | 8 | H | X | | ♣ | | | | | | ♣ | | |
| | | 8 | 24 | 40 | 56 | 72 | 88 | 104 | 120 | 136 | 152 | 168 | 184 | 200 | 216 | 232 | 248 |
| 9 | 1001 | | | ) | 9 | I | Y | | | | | | | | | | |
| | | 9 | 25 | 41 | 57 | 73 | 89 | 105 | 121 | 137 | 153 | 169 | 185 | 201 | 217 | 233 | 249 |
| A | 1010 | LF | SUB | * | : | J | Z | | ◆ | | | | | | ◆ | | |
| | | 10 | 26 | 42 | 58 | 74 | 90 | 106 | 122 | 138 | 154 | 170 | 186 | 202 | 218 | 234 | 250 |
| B | 1011 | | ESC | + | ; | K | [ | | | | | | | | | | |
| | | 11 | 27 | 43 | 59 | 75 | 91 | 107 | 123 | 139 | 155 | 171 | 187 | 203 | 219 | 235 | 251 |
| C | 1100 | FF | | , | < | L | £ | | | | | | | | | | |
| | | 12 | 28 | 44 | 60 | 76 | 92 | 108 | 124 | 140 | 156 | 172 | 188 | 204 | 220 | 236 | 252 |
| D | 1101 | CR | | − | = | M | ] | | | CS | | | | | | | |
| | | 13 | 29 | 45 | 61 | 77 | 93 | 109 | 125 | 141 | 157 | 173 | 189 | 205 | 221 | 237 | 253 |
| E | 1110 | SO | | . | > | N | ↑ | | π | | | | | | π | | |
| | | 14 | 30 | 46 | 62 | 78 | 94 | 110 | 126 | 145 | 158 | 174 | 190 | 206 | 222 | 238 | 254 |
| F | 1111 | SI | | / | ? | O | ← | | | | | | | | | | π |
| | | 15 | 31 | 47 | 63 | 79 | 95 | 111 | 127 | 146 | 159 | 175 | 191 | 207 | 223 | 239 | 255 |



# CBM Standard Font in Business Character Mode (Cursor Down)

| Upper Bit / Lower Bit | Hex. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hex. | Binary | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | | POS | SP | ø | @ | p | | P | | | SP | | | P | SP | |
| | | 0 | 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 | 144 | 160 | 176 | 192 | 208 | 224 | 240 |
| 1 | 0001 | | CURSOR DOWN | ! | 1 | a | q | A | Q | | CURSOR UP | | | A | Q | | |
| | | 1 | 17 | 33 | 49 | 65 | 81 | 97 | 113 | 129 | 145 | 161 | 177 | 193 | 209 | 225 | 241 |
| 2 | 0010 | | RVS ON | " | 2 | b | r | B | R | | RVS OFF | | | B | R | | |
| | | 2 | 18 | 34 | 50 | 66 | 82 | 98 | 114 | 130 | 146 | 162 | 178 | 194 | 210 | 226 | 242 |
| 3 | 0011 | | DC3 | # | 3 | c | s | C | S | | DC3 | | | C | S | | |
| | | 3 | 19 | 35 | 51 | 67 | 83 | 99 | 115 | 131 | 147 | 163 | 179 | 195 | 211 | 227 | 243 |
| 4 | 0100 | | | $ | 4 | d | t | D | T | | | | | D | T | | |
| | | 4 | 20 | 36 | 52 | 68 | 84 | 100 | 116 | 132 | 148 | 164 | 180 | 196 | 212 | 228 | 244 |
| 5 | 0101 | | | % | 5 | e | u | E | U | | | | | E | U | | |
| | | 5 | 21 | 37 | 53 | 69 | 85 | 101 | 117 | 133 | 149 | 165 | 181 | 197 | 213 | 229 | 245 |
| 6 | 0110 | | | & | 6 | f | v | F | V | | | | | F | V | | |
| | | 6 | 22 | 38 | 54 | 70 | 86 | 102 | 118 | 134 | 150 | 166 | 182 | 198 | 214 | 230 | 246 |
| 7 | 0111 | | | ' | 7 | g | w | G | W | | | | | G | W | | |
| | | 7 | 23 | 39 | 55 | 71 | 87 | 103 | 119 | 135 | 151 | 167 | 183 | 199 | 215 | 231 | 247 |
| 8 | 1000 | BS | | ( | 8 | h | x | H | X | | | | | H | X | | |
| | | 8 | 24 | 40 | 56 | 72 | 88 | 104 | 120 | 136 | 152 | 168 | 184 | 200 | 216 | 232 | 248 |
| 9 | 100↑ | | | ) | 9 | i | y | I | Y | | | | | I | Y | | |
| | | 9 | 25 | 41 | 57 | 73 | 89 | 105 | 121 | 137 | 153 | 169 | 185 | 201 | 217 | 233 | 249 |
| A | 1010 | LF | SUB | * | : | j | z | J | Z | | | | | J | Z | | |
| | | 10 | 26 | 42 | 58 | 74 | 90 | 106 | 122 | 138 | 154 | 170 | 186 | 202 | 218 | 234 | 250 |
| B | 1011 | | ESC | + | ; | k | [ | K | | | | | | K | | | |
| | | 11 | 27 | 43 | 59 | 75 | 91 | 107 | 123 | 139 | 155 | 171 | 187 | 203 | 219 | 235 | 251 |
| C | 1100 | FF | | , | < | l | £ | L | | | | | | L | | | |
| | | 12 | 28 | 44 | 60 | 76 | 92 | 108 | 124 | 140 | 156 | 172 | 188 | 204 | 220 | 236 | 252 |
| D | 1101 | CR | | − | = | m | ] | M | | CS | | | | M | | | |
| | | 13 | 29 | 45 | 61 | 77 | 93 | 109 | 125 | 141 | 157 | 173 | 189 | 205 | 221 | 237 | 253 |
| E | 1110 | SO | | . | > | n | ↑ | N | | | | | | N | | | |
| | | 14 | 30 | 46 | 62 | 78 | 94 | 110 | 126 | 145 | 158 | 174 | 190 | 206 | 222 | 238 | 254 |
| F | 1111 | SI | | / | ? | o | ← | O | | | | | | O | | | |
| | | 15 | 31 | 47 | 63 | 79 | 95 | 111 | 127 | 146 | 159 | 175 | 191 | 207 | 223 | 239 | 255 |



## ASCII Character Mode

| Upper Bit / Lower Bit | Hex. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hex. | Binary | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | | POS | SP | 0 | @ | P | ` | p | | POS | *SP* | *0* | *@* | *P* | *`* | *p* |
| | | 0 | 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 | 144 | 160 | 176 | 192 | 208 | 224 | 240 |
| 1 | 0001 | | | ! | 1 | A | Q | a | q | | | *!* | *1* | *A* | *Q* | *a* | *q* |
| | | 1 | 17 | 33 | 49 | 65 | 81 | 97 | 113 | 129 | 145 | 161 | 177 | 193 | 209 | 225 | 241 |
| 2 | 0010 | | | " | 2 | B | R | b | r | | | " | *2* | *B* | *R* | *b* | *r* |
| | | 2 | 18 | 34 | 50 | 66 | 82 | 98 | 114 | 130 | 146 | 162 | 178 | 194 | 210 | 226 | 242 |
| 3 | 0011 | | DC3 | # | 3 | C | S | c | s | | DC3 | *#* | *3* | *C* | *S* | *c* | *s* |
| | | 3 | 19 | 35 | 51 | 67 | 83 | 99 | 115 | 131 | 147 | 163 | 179 | 195 | 211 | 227 | 243 |
| 4 | 0100 | | | $ | 4 | D | T | d | t | | | *$* | *4* | *D* | *T* | *d* | *t* |
| | | 4 | 20 | 36 | 52 | 68 | 84 | 100 | 116 | 132 | 148 | 164 | 180 | 196 | 212 | 228 | 244 |
| 5 | 0101 | | | % | 5 | E | U | e | u | | | *%* | *5* | *E* | *U* | *e* | *u* |
| | | 5 | 21 | 37 | 53 | 69 | 85 | 101 | 117 | 133 | 149 | 165 | 181 | 197 | 213 | 229 | 245 |
| 6 | 0110 | | | & | 6 | F | V | f | v | | | *&* | *6* | *F* | *V* | *f* | *v* |
| | | 6 | 22 | 38 | 54 | 70 | 86 | 102 | 118 | 134 | 150 | 166 | 182 | 198 | 214 | 230 | 246 |
| 7 | 0111 | | | ' | 7 | G | W | g | w | | | *'* | *7* | *G* | *W* | *g* | *w* |
| | | 7 | 23 | 39 | 55 | 71 | 87 | 103 | 119 | 135 | 151 | 167 | 183 | 199 | 215 | 231 | 247 |
| 8 | 1000 | BS | | ( | 8 | H | X | h | x | BS | | *(* | *8* | *H* | *X* | *h* | *x* |
| | | 8 | 24 | 40 | 56 | 72 | 88 | 104 | 120 | 136 | 152 | 168 | 184 | 200 | 216 | 232 | 248 |
| 9 | 1001 | | | ) | 9 | I | Y | i | y | | | *)* | *9* | *I* | *Y* | *i* | *y* |
| | | 9 | 25 | 41 | 57 | 73 | 89 | 105 | 121 | 137 | 153 | 169 | 185 | 201 | 217 | 233 | 249 |
| A | 1010 | LF | SUB | * | : | J | Z | j | z | NL | SUB | *** | *:* | *J* | *Z* | *j* | *z* |
| | | 10 | 26 | 42 | 58 | 74 | 90 | 106 | 122 | 138 | 154 | 170 | 186 | 202 | 218 | 234 | 250 |
| B | 1011 | | ESC | + | ; | K | [ | k | { | | ESC | *+* | *;* | *K* | *[* | *k* | *{* |
| | | 11 | 27 | 43 | 59 | 75 | 91 | 107 | 123 | 139 | 155 | 171 | 187 | 203 | 219 | 235 | 251 |
| C | 1100 | FF | | , | < | L | \ | l | ¦ | FF | | *,* | *<* | *L* | ** | *l* | *¦* |
| | | 12 | 28 | 44 | 60 | 76 | 92 | 108 | 124 | 140 | 156 | 172 | 188 | 204 | 220 | 236 | 252 |
| D | 1101 | CR | | − | = | M | ] | m | } | CR | | *−* | *=* | *M* | *]* | *m* | *}* |
| | | 13 | 29 | 45 | 61 | 77 | 93 | 109 | 125 | 141 | 157 | 173 | 189 | 205 | 221 | 237 | 253 |
| E | 1110 | SO | | . | > | N | ^ | n | ~ | SO | | *.* | *>* | *N* | *^* | *n* | *~* |
| | | 14 | 30 | 46 | 62 | 78 | 94 | 110 | 126 | 142 | 158 | 174 | 190 | 206 | 222 | 238 | 254 |
| F | 1111 | SI | | / | ? | O | _ | o | | SI | | */* | *?* | *O* | *_* | *o* | |
| | | 15 | 31 | 47 | 63 | 79 | 95 | 111 | 127 | 143 | 159 | 175 | 191 | 207 | 223 | 239 | 255 |

Italics

```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
```

# APPENDIX E
# (Programming Through Secondary Address)

The secondary address concept is introduced in "PRINTER-ASSOCIATED COMMANDS."
This concept instructs the printer to perform the functions listed below.

| Secondary Address | Functions |
|---|---|
| 0 (default) | Print in Graphic Character mode |
| 3 | Set a page length |
| 6 | Set a linefeed pitch |
| 7 | Print in Business Character mode |
| 10 | Reset the printer |
| 13 | Designate Condensed Character mode |

# APPENDIX F (Control Code Summary)

| Categorty | Item | Symbol | CHR$ Code | Function | | Page |
|---|---|---|---|---|---|---|
| Print Command | 1 | LF | CHR$(10) | Linefeed and carriage return after printing | | 23 |
| | 2 | CR | CHR$(13) | CBM mode | Linefeed and carriage return after printing | 24 |
| | | | | ASCII mode | After printing, carriage return only or plus linefeed | 24 |
| | | CS | CHR$(141) | CBM mode | Printing and carriage return | 25 |
| | | | | ASCII mode | After printing, carriage return only or plus linefeed | 25 |
| | 4 | FF | CHR$(12) | Form feed and carriage return after printing | | 26 |
| Double-Width Character/ Condensed Character | 5 | SO | CHR$(14) | Double-width character mode designation | | 27 |
| | 6 | SI | CHR$(15) | CBM mode | Double-width character mode termination | 28 |
| | | | | ASCII mode | Condensed character mode designation | 28 |
| | 7 | DC2 | CHR$(18) | Condensed character mode termination (Valid only in ASCII mode) | | 28 |
| | 8 | DC4 | CHR$(20) | Double-width character mode termination (Valid only in ASCII mode) | | 29 |
| Software Reset | 9 | ESC·@ | CHR$(27) CHR$(64) | Initialize the printer (Valid only in ASCII mode) | | 29 |
| Graphic Printing/ Back Space | 10 | BS | CHR$(8) | CBM mode | Graphic printing mode designation | 30 |
| | | | | ASCII mode | After printing move one character position to the left | 31 |
| | 11 | SUB | CHR$(26) CHR$($n_1$) CHR$($n_2$) | Repeat a column of graphics data (Valid only in CBM mode) | | 32 |
| Print Character | 12 | UP | CHR$(145) | Graphic Character mode (Cursor UP) (Valid only in CBM mode) | | 33 |
| | 13 | DOWN | CHR$(17) | Business character mode (Cursor DOWN) (Valid only in CBM mode) | | 33 |
| Reverse Character | 14 | RVS ON | CHR$(18) | Reverse Character designation (Valid only in CBM mode) | | 34 |
| | 15 | RVS OFF | CHR$(146) | Reverse Character termination (Valid only in CBM mode) | | 34 |
| | 16 | QUOTE | CHR$(34) | When control character codes (0~31 and 128~159) are in between quotation marks, they will print reversed characters (64~95 and 192~223) respectively. (Valid only in CBM mode) | | 35 |
| Print Start Position | 17 | POS | CHR$(16) "$n_1$ $n_2$" | Specify print position in Pica Character units (Valid only in CBM mode) | | 38 |
| | 18 | ESC·POS | CHR$(27) CHR$(16) CHR$($n_1$) CHR$($n_2$) | Specify print position in 1/60-inch units (Valid only in CBM mode) | | 38 |

| Categorty | Item | Symbol | CHR$ Code | Function | Page |
|---|---|---|---|---|---|
| Italic Character | 19 | ESC·4 | CHR$(27) "4" | Italic character mode designation | 39 |
| | 20 | ESC·5 | CHR$(27) "5" | Italic character mode termination | 39 |
| Underline | 21 | ESC·–·01 | CHR$(27) "–" CHR$(1) | Underline designation | 40 |
| | 22 | ESC·–·00 | CHR$(27) "–" CHR$(0) | Underline termination | 40 |
| Skip-Over Perforation | 23 | DC3 | CHR$(19) | Skip-over perforation termination | 41 |
| | 24 | DC3 | CHR$(147) | Skip-over perforation designation | 41 |
| Print Direction | 25 | ESC·U·01 | CHR$(27) "U" CHR$(1) | Unidirectional printing | 42 |
| | 26 | ESC·U·00 | CHR$(27) "U" CHR$(0) | Bidirectional printing | 42 |
| Double-Strike Character | 27 | ESC·G | CHR$(27) "G" | Double-strike character designation | 43 |
| | 28 | ESC·H | CHR$(27) "H" | Double-strike character termination | 43 |
| Character Pitch | 29 | ESC·M | CHR$(27) "M" | Elite pitch designation | 44 |
| | 30 | ESC·P | CHR$(27) "P" | Pica pitch designation | 44 |
| Margin Setting | 31 | ESC·l·n | CHR$(27) CHR$(108) CHR$(n) | Left margin designation | 45 |
| | 32 | ESC·Q·n | CHR$(27) "Q" CHR$(n) | Right margin designation | 45 |
| Superscript and Subscript | 33 | ESC·S·00 | CHR$(27) "S" CHR$(0) | Superscript designation | 46 |
| | 34 | ESC·S·01 | CHR$(27) "S" CHR$(1) | Subscript designation | 46 |
| | 35 | ESC·T | CHR$(27) "T" | Superscript/Subscript termination | 46 |
| Near Letter Quality | 36 | ESC·x·01 | CHR$(27) CHR$(120) CHR$(1) | NLQ designation | 47 |
| | 37 | ESC·x·00 | CHR$(27) CHR$(120) CHR$(0) | NLQ termination | 47 |
| Linefeed Pitch | 38 | ESC·3·n | CHR$(27) "3" CHR$(n) | Set linefeed pitch of n/216 inch | 48 |
| Emphasized Character | 39 | ESC·E | CHR$(27) "E" | Emphasized character designation | 49 |
| | 40 | ESC·F | CHR$(27) "F" | Emphasized character termination | 49 |
| Double-Width Character | 41 | ESC·W·1 | CHR$(27) CHR$(87) "1" | Double-width character designation | 50 |
| | 42 | ESC·W·0 | CHR$(27) CHR$(87) "0" | Double-width character termiantion | 50 |

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